SEP 16 1924

SPECIAL INFORMATION NUMBER

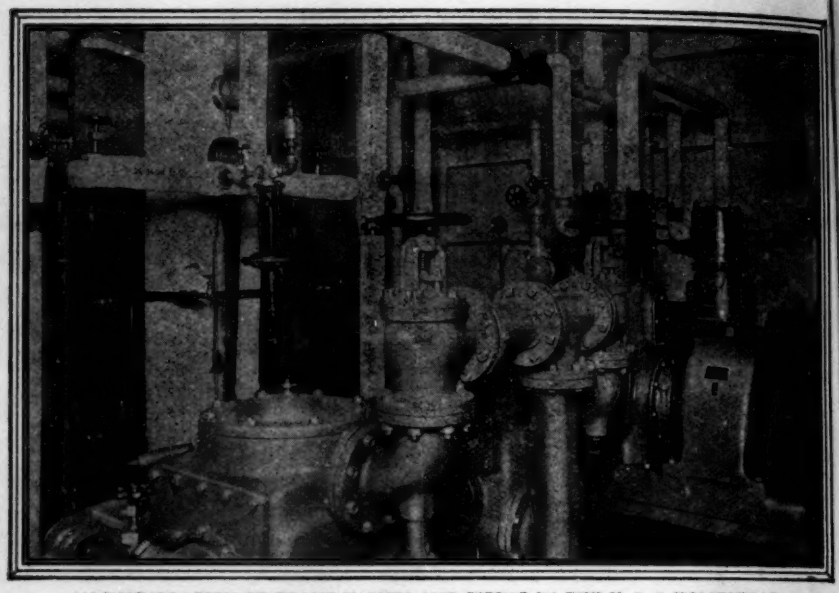
United States Naval Institute Proceedings

VOL. 50 SEPTEMBER, 1924 NO. 259

CONTENTS

A Few Reflections on Our Navy and Some of Its Needs.—Eberle	1399
Naval Strategy.—Schofield	1408
The Proposal For a United Air Service.—Johnson	1422
Naval Intelligence.—McNamee	1443
The U. S. Naval Reserve Force.—Schofield	1453
The Naval Officer in Diplomacy.—Knapp	1473
Danger of Disarming America.—Overstreet	1492
The Peace Time Services and Costs of the Navy.—Yarnell	1499
Conditions of the American Navy.—Ballou	1509
Professional Notes	1519
Notes on International Affairs	1593
Book Reviews	1596
Secretary's Notes	1605

Copyright 1924, by U. S. Naval Institute



AN INSTALLATION OF CRANE VALVES AND PIPING IN THE U. S. S. HOMESTEAD

THE PILOT WHO BRINGS TESTIMONIALS

In many important shipyards, the Crane name is the accepted guide to dependable materials for all piping requirements. Yet no one has to take this guide on mere say-so. Countless installations of Crane valves, fittings and piping testify to their fitness for marine requirements. Hundreds of engineers of sound reputation continue to recommend and specify Crane materials for every important job. And the material evidence, the wide variety of Crane products of standardized design, can be inspected in the Crane Exhibit Rooms at practically every shipbuilding center in the country.

CRANE

GENERAL OFFICES: CRANE BUILDING, 836 S. MICHIGAN AVENUE, CHICAGO
CRANE LIMITED: CRANE BUILDING, 386 BEAVER HALL SQUARE, MONTREAL

Branches and Sales Offices in One Hundred and Forty-five Cities
National Exhibit Rooms: Chicago, New York, Atlantic City, San Francisco and Montreal
Works: Chicago, Bridgeport, Birmingham, Chattanooga, Trenton and Montreal

CRANE EXPORT CORPORATION: NEW YORK, SAN FRANCISCO
CRANE-BENNETT, LTD., LONDON
CIE CRANE: PARIS, NANTES, BRUSSELS

Crane Cross Stop Valve, No. 4363

United States Naval Institute Proceedings

September, 1924

Edited by H. G. S. Wallace

U. S. Naval Institute

Publication Office: Menasha, Wisconsin
Editorial and Business Office: Annapolis, Maryland

COPYRIGHT, 1924
BY
U. S. NAVAL INSTITUTE

The Collegiate Press
GEORGE BANTA PUBLISHING CO.
MENASHA, WIS.

Foreword

The American people want, and in the long run will have, the kind of a Navy which to them seems best to meet their needs. The future of the Navy therefore depends upon how clearly the American people can be made to see the need for a navy, and the place the Navy fills, in peace as well as in war. Recognition of that need does not by any means imply a spirit of aggression. That the American people will ever engage upon a war of aggression is now unthinkable, whatever size the Navy may attain. War, even for defense, seems now remote. The Navy's mission therefore lies not so much in readiness to resist attack, even though such readiness is vital to efficiency, as in the maintenance of peace. A navy equal to the best navy of any other country is not only a balance of power but a balance for peace.

October 27th has been designated as Navy Day. Occasion will then arise when many officers will be called upon, some of them to make addresses, some to answer questions, some to furnish material for articles on naval topics. Upon no class more than upon the officers of the Navy does the obligation rest to explain the Navy to the country. If the will of the American people is to be an intelligent will, it must be based upon correct information, that its conclusions may be sound. Those who know the Navy must bring the Navy to the people.

It is to meet the need of those who may be so called upon that this number of the Proceedings has been brought together, covering the various branches of naval activity, as a ready reference of authoritative information. The "Comparative Naval Data for the Treaty Powers," on page 1581 of the Professional Notes section, is of particular value in the discussion of other navies, whose size and characteristics form a background for our own.

The Board of Control hopes that this special number, similar to that published in May, 1923, may meet with a reception equally favorable, and may prove not only interesting, but of material assistance, to those whose duty it is to safeguard the interests of the Navy and the country.

EDITOR.

16" Guns of the "West Virginia"

UNITED STATES
NAVAL INSTITUTE
PROCEEDINGS

VOL. NO. 50, NO. 9 SEPTEMBER, 1924 WHOLE NO. 259

16" GUNS OF THE "WEST VIRGINIA"

A FEW REFLECTIONS ON OUR NAVY AND SOME OF ITS NEEDS

BY ADMIRAL EDWARD W. EBERLE, U. S. NAVY

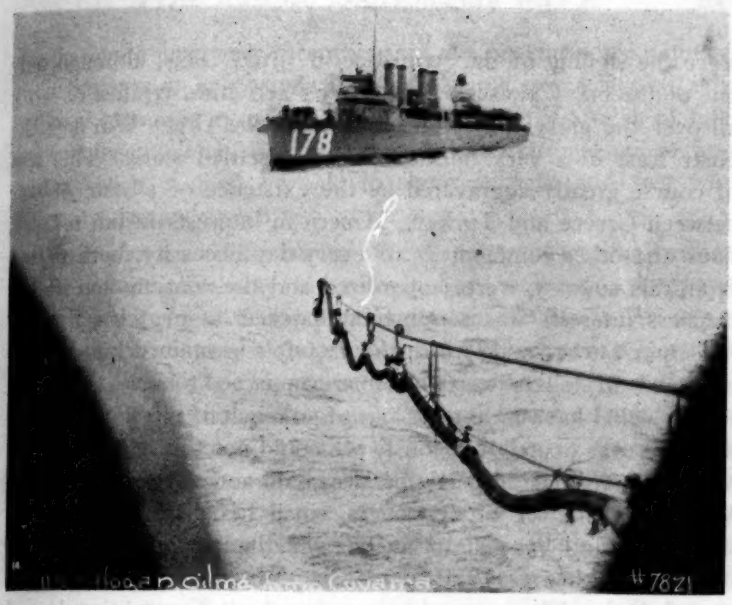
BECAUSE of the fact that in time of peace the Navy is out of sight, it is in consequence out of mind to the average citizen, who has very little conception of its work and therefore of its needs. He sees brief mention from time to time in the daily papers of certain ships doing this or that, but more often his impressions of the Navy and its activities are formed by photographs appearing in the illustrated papers, depicting the arrival or departure of the fleet, but making little or no mention of what the fleet does. Inasmuch as the Navy is a national institution, it must have the intelligent backing of the people—not spasmodically, in time of war, but in time of peace as well. For this reason a few remarks on the Navy and its needs may not be inappropriate.

Briefly speaking, the "mission" of the U. S. Navy is in co-operation with the navies of other powers to preserve the peace of the world. Its primary duty is to keep us out of war, but failing this, it becomes the first line of our national defense system. The indoctrination of the Navy is peace—peace by all fair and honorable means—and the promotion of our economic interests throughout the world. Our national prosperity is becoming more and more dependent upon our success in the great competitive markets of the world, where we send our surplus products thereby stabilizing prices here at home, and from whence we import those

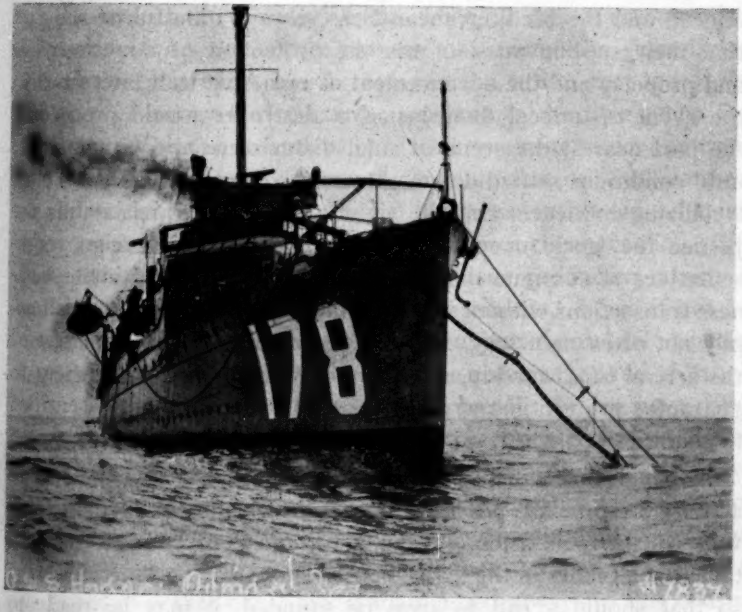
products that we require to maintain our standards of living. This flow of valuable cargoes back and forth across the seven seas makes it imperative that they should be made safe highways, and this constitutes one of the Navy's important duties. The Navy guarantees safe conduct at sea for the tremendous volume of our import and export trade, upon which we are so dependent for our prosperity. In addition, the Navy does a great deal more for our economic welfare, as is evidenced by the fact that it was the American Navy which opened the markets of China, Japan, and lastly Turkey, to our business. As a commercial agent the Navy is of inestimable value to us. I do not mean to create the false impression that the Navy spends its time cruising around the world drumming up trade, but by its mere presence in foreign ports it facilitates the operations of our citizens abroad and by its strength makes their business dealings possible, guarantees that these will be accorded every just privilege and a full measure of fair play.

Modern science has made it impossible for us or for any other nation to live alone, isolated from the rest of the world. A century ago it took weeks to cross the Atlantic. Now the trip can be made in a matter of hours by airplane. The United States and Europe have been brought together in every sense of expression, in a ratio commensurate with this decrease in the time necessary to span the ocean which separates us. Our commerce, our business and our daily life in all of its vicissitudes are a part of the life of the whole world. No great disturbance can occur anywhere that we do not feel its effects here in this country. Our ships carrying our wealth to and from every quarter of the globe are sufficient indication of the dependence of our people on overseas trade for their prosperous livelihood to make further discussion on this point unnecessary. Our national prosperity depends in a very great measure indeed upon our export and import opportunities and these in turn depend largely, if not entirely, upon the existence of the Navy, whose recognized policy is, "To support in every way American interests, especially the extension and development of American foreign commerce."

As a concrete example of how the Navy accomplishes its duty of supporting the extension and the development of American foreign interests, let us review briefly its work in the Near East



I



U. S. S. "Hogan" Oiling at Sea from U. S. S. "Cuyama"

II

since the signing of the Armistice in 1918. This, although only one of the many phases of the Navy's activities, typifies its work all over the globe. The termination of the Great War left the Near East in a very unhealthy and unsettled state. This was of course greatly aggravated by the existence of a state of war between Greece and Turkey. American interests in oil, tobacco, flour and other commodities of every-day necessity, both to and from this country, were jeopardized and the continuation of our business interests was seriously threatened. Our tobacco warehouses in Turkey and Greece, for example, contained hundreds of thousands of dollars' worth of American-owned tobacco, the loss of which would have meant the loss of so much of our capital. The situation was acute. Obviously we could not send an army over there to guard our property, but we could and did send the Navy. We sent a number of destroyers, small light draft, and almost self-supporting vessels, to anchor off the principal centers of our business interests and to see that fair play and justice were accorded us. These vessels were based on Constantinople and from there cruised almost continuously in the Black Sea, the Ægean and the Mediterranean Seas, always mindful of the fact that their specific mission was the protection of American life and property and the advancement of our American interests. In the event of a local disturbance, a destroyer would proceed to the port nearest the scene of such disturbance and remain there until conditions settled down. Invariably its presence had a most stabilizing influence, and the sight of the flag which stands for justice the world over made it possible for our foreign representatives to continue their perfectly lawful and legitimate business transactions without interruption. Armed intervention is happily not often necessary, for as a general rule the moral effect of the arrival of a warship, ready for business, is quite sufficient to guarantee protection and a square deal to those who are entitled to claim it.

Although this is one of the most important phases of the Navy's activity in time of peace, and one to which we have devoted very considerable attention, the Navy must, of course, be maintained at all times in the highest possible state of fighting efficiency, so that should a call to arms be sounded, it may be ready to respond at a moment's notice. This it does, for even those destroy-

ers that were until very recently based at Constantinople withdrew from that port at periodical intervals for gunnery and other military exercises in order to keep them at the top notch of fighting efficiency. The Navy is our great international police force and as such it must be able to shoot straight and fast when necessity demands such procedure.

We are not a warlike nation. We do not want war and we seek in every honorable way to avoid it, but we must be prepared, for unpreparedness is a potent invitation for war. We are so situated from a geographic standpoint that no power can make war on us unless it come to us across the seas. If our Navy is relatively strong enough to prevent a hostile power from crossing the seas to the coasts of these United States or to our island possessions, we know that we are secure. But unless this ratio exists, our security is by no means certain. There are those who contend that a strong Navy invites trouble. This may or may not be true for other countries, but it certainly does not apply to us, for we have all the territory that we need in which to expand, and we do not, therefore, have to seek an outlet for our growing population. If the time ever comes when we cannot accommodate our own people, then other nations may doubt the sincerity of our motives, but that time is so far in the future that we of the present age cannot even hazard a guess as to the time of its fulfillment. We possess undeveloped and virgin territory sufficient for our needs for many years to come, so that on this score we need have no fear that a strong Navy, or rather an adequate Navy, will induce us to use it for purposes of aggression. We have natural wealth in abundance and our productive ability is such that it exceeds our domestic requirements. Were it not for the luxuries of life, we could live self-supporting and self-sustaining for an almost indefinite period. We are not the kind of people who are apt to lose their heads and run wild in conquest. We must have a Navy strong enough to protect our rights and insure to us the privilege of living in peaceful security, free to enjoy the fruits of our honest labors. Under the terms of the Limitation of Armament Treaty, we are authorized to maintain a Navy equal to that of Great Britain and five-thirds that of Japan. It behooves us to see to it that our Navy is maintained always in this relative strength.

The principal unit of our naval organization is, as its name implies, the United States Fleet, consisting of battleships, cruisers, destroyers, submarines and aircraft, with their tenders and repair ships. This fleet is the backbone of the service and is the first line of our national defenses. It cruises in both the Atlantic and Pacific oceans, mobile and ready in all respects for any emergency. As a strictly military unit its activities are confined solely to work of this nature. It is maintained at all times at the height of fighting efficiency by intensive exercises of all sorts, and its complete mobilization can be effected in a very short time. It is our national fire department and is ready to respond to any alarm.

Although this fleet is a powerful one, it is not up to the standards which we are entitled to maintain under the terms of the Limitation of Armament Treaty. During the present year we shall have eighteen battleships in the Navy, of which thirteen require extensive modernizations with respect to the elevation of their guns and the installation of blister protection against under-water attack. Six of these thirteen battleships are coal burners and should be converted to oil burners. These vitally important alterations involve the expenditure of approximately $30,000,000, but, by making them, the efficiency of our battleship fleet will be almost doubled. The greatest weakness of the fleet lies in the deficiency of modern light cruisers, of which we have now only ten. For a well-balanced fleet this number is entirely inadequate. Until comparatively recently our principal effort has been directed toward attaining equality with other powers in the matter of capital ships and destroyers. Until we had attained this strength, it was not considered the part of wisdom to undertake the construction of cruisers. Now, however, we are in a position to go ahead with this work and as a matter of fact, the addition of these vessels to our fleet is absolutely necessary in order that it may be prepared to meet a hostile fleet on a footing of equality. The Great War taught us to appreciate the value of cruisers. You will doubtless recall that two German cruisers acting alone and unsupported by shore facilities, destroyed 200,000 tons of British shipping before they were sunk and that it required more than 100 vessels of the British Navy to accomplish this end. If we ever engage in a naval war again, we shall have greater and more difficult problems for our own cruisers to contend with

than Great Britain had during the late war. At the present time we have only ten vessels which are suitable to drive off enemy light cruisers and with which to protect our commerce. Obviously this number is entirely inadequate. Destroyers, although valuable, can never take the place of cruisers. In order to remedy this defect, the Secretary of the Navy has urged upon Congress to provide sufficient funds to lay down eight cruisers during the fiscal year 1925, and it is earnestly hoped that Congress will see fit to approve of this recommendation, thereby making our fleet more nearly equal in strength to that of Great Britain.

In submarines our fleet is weak and really should be reinforced by at least twelve of the large, cruiser type submarines, whose value as an independent scout is great. As mine-laying vessels these large submarines are also of inestimable value to the successful operations of a fleet. It has not been considered advisable, however, to recommend the construction of twelve of these vessels at this time and in consequence the number has been decreased to three, for which Congress has been asked to provide.

With respect to aircraft, which have become an essential to the fleet, we are making satisfactory progress in the development of this important arm. Inasmuch as aviation is only very little past the infant stage, we must of course continue with our experimental work, while at the same time maintaining a force of well-trained aviators and up-to-date airplanes. This we are doing and on this score we are in a satisfactory condition. The practicability of airplane-carrying vessels has been established beyond all doubt, so that our fleet, in order to be a well-balanced one, should number several vessels of this class in its composition. Two of our intended battle cruisers are now being converted into carriers and it is expected that they will fill the requirements of this type of vessel in all respects.

The development of aircraft in recent years has made them extremely useful in scouting, torpedo and bombing attack, control of fire, and for fighting off enemy aircraft and in this way preventing them from attacking our ships. It is considered highly important that each battleship and each light cruiser and a number of destroyers, as well as submarines, should carry aircraft to assist them in their scouting and screening operations. These aircraft should be in addition to those that will be operated from the

carriers and should in fact be considered as an integral part of the ship to which they are attached. We now have in commission an airplane-carrying submarine which gives promise of being highly successful and of being the forerunner of other and similar types.

The second principal subdivision of our naval forces is the Asiatic Fleet, consisting of a cruiser as the flagship, and a number of destroyers and gunboats. This fleet cruises in Asiatic waters, and a part of it, known as the Yangtse Patrol, consisting of light, shallow draft gunboats, patrols that great river of China from its mouth, two thousand miles into the heart of that country. Unfortunately, our gunboats which are now performing this duty are absolutely worn out and a discredit to this great country of ours. China is in turmoil and seems to be unable to settle down to a condition of recognized law and order, for which reason it seems probable that this patrol will have to be continued indefinitely in order to provide safe-conduct to our merchant vessels and guarantee the safety of American lives and American interests in that part of the world.

Merchant vessels proceeding up the Yangtse River on their perfectly lawful voyages are fired upon with alarming frequency by Chinese bandits and irregular troops, and they must, therefore, be accorded the protection of armed vessels. It is important, too, that our men-of-war engaged in this duty should compare favorably in their appearance and in their capabilities to foreign vessels engaged in the same work in order that this influence may be reflected in trade advantages. An "Open Door" in China is of no use to us if we do not take advantage of it. The best way to keep this great Chinese market open to American trade on terms of equality with other major powers is to maintain suitable gunboats on the Yangtse River, which is the line of communication for forty millions of people. Congress has been asked to appropriate funds for the construction of six modern gunboats to replace those obsolete ones which are now "flying the flag" on this river.

Although the Asiatic Fleet is a military unit of the naval service and as such maintains itself in a high state of efficiency, its paramount duty is the protection of American life and property and the advancement of American commercial interests in the Far

East. It has a permanent base in the Philippines and operates from there as necessity or diplomatic advisability may dictate.

The third subdivision of our naval forces is the Special Service Squadron, consisting of five light cruisers of the second line, and is based on the Panama Canal Zone. From there it cruises in the waters of Latin America, primarily in the interests of American commercial enterprises in those countries and as a diplomatic agent, to cement and maintain the cordial relations which happily exist between the two continents. These vessels, although adequate, do not compare favorably with the vessels of other great powers engaged in similar duty; but as we have more pressing demands from other quarters, they must suffice for the present. In European waters the Navy is represented by a cruiser as flagship and by a small detachment of destroyers. These vessels visit various ports in order to "show the flag" and to promote good will and cordial relations between the United States and European countries. Their mission is a commercial-diplomatic one and their presence abroad has been of the greatest value in maintaining and increasing our economic relations with those powers with whom they come in daily contact.

In conclusion let me say that although our Navy is not up to the standards which we are authorized to maintain under the Limitation of Armament Treaty, it is an efficient, well organized and well directed service. In order, however, for it properly to support our policies and our commerce, and to guard our continental and overseas possessions, it is imperative that it be brought up to that standard allowed us by treaty—second to none in all respects. This can be accomplished only by the citizenry of this country making it their business to know their Navy and its needs and giving it their loyal backing and support.

NAVAL STRATEGY[1]

By Rear Admiral Frank H. Schofield, U. S. Navy

I WISH to talk to you today about naval strategy. Before plunging too boldly into the subject, let us consider two or three related ideas.

We frequently hear the phrase "a navy for defense only." That is a very vague and misleading phrase because there are two kinds of defense, which Mahan very aptly calls defense in a political sense and defense in a military sense. "A navy for defense only" in a political sense is one that will be used only in case we are forced into war, but one that in war is strong enough to attack. "A navy for defense only" in a military sense means a navy that is so weak that the best it can do is to await attack and to defend its own ports, leaving the enemy at ease as regards his own interests and at liberty to choose his own time and manner of fighting.

Ordinarily when mention is made of "a navy for defense only" it means a navy for defense in a military sense, a weak navy—a short radius navy. Defense in a military sense is rarely effective toward concluding a war—never effective when it comes to national defense. It is most effective when applied to a local situation, to some point that must be held.

In a national way effective defense is best promoted by the power to injure. Compare the respect one accords to the bulldog and to the turtle. I do not think that this point can be emphasized too much. A navy for proper defense is one that all possible enemies have to respect in peace and fear in war, one able to go after them if occasion requires.

Every power that has based its naval program on a coast defense idea, a military defense instead of a political defense, has

[1] A paper read to newspaper men visiting the Fleet at Culebra, February, 1924.

failed to achieve its object. To build and maintain a navy of that kind is poor naval strategy.

There is still another aspect of this "navy for defense only" idea that we cannot afford to neglect. I can do no better here than to quote Admiral Mahan's exact words:

> The most beneficial use of a (naval) force is not to *wage* war, however successfully, but to prevent war with all its suffering, expense and complication of embarrassments. Of course, therefore, a navy for defense only, from which an enemy need fear no harm, is of small account in diplomatic relations, for it is nearly useless as a deterrent from war.

So much for the defense idea.

Another idea that is very prevalent is that a great navy can spring into being at the beginning of a war and operate effectively in national defense. Under modern conditions, it is not too much to say that the entire complexion of the first two years of any naval war in which we may become engaged, will be determined by what we have done in time of peace in the way of preparing the Navy for the future. This statement is true because of the length of time it takes to build new ships, to train additional men, and to assemble all the paraphernalia of naval war and transport it to the area where battles must be fought. It is for this reason that the Navy constantly urges that the vessels and personnel of the Navy be kept in a perpetual state of readiness; that it never considers that state satisfactory unless the American Navy is at least equal in strength to any naval force that may be brought against it anywhere.

From the foregoing it will be seen that naval strategy is a matter of peace time effort as well as war time effort, and that the business of conducting war really extends, as we all know if we stop to think, into days of the most profound peace. This is so true that we know when international reforms are proposed or sponsored by foreign governments, there always lies behind them a motive of interest of special advantage to the government that proposes the change. As an example I may mention the attitude that was held by some powers regarding the abolition of submarines at the Washington Conference. The power that had the greatest merchant marine on the sea was the one most ardently advocating the abolition of submarines, because it did not wish its merchant ships endangered in case it went to war. Safety

for one's own interests, insecurity for the interests of possible enemies—there you have the key note. The powers that had the fewest merchant ships on the sea saw possibilities that their submarines might be useful to attack the vital commercial interests of possible enemies and so did not favor the abolition of submarines. They desired to preserve for their own forces the maximum power to injure sound strategy. Here in this question you see in time of peace national selfish interests working under the cloak of benevolent words.

Any power that expects successfully to develop its naval strategy in time of peace has to have a clear understanding of the naval strategy of war. Naval strategy in war is not something separate and distinct from other war activities, but is a part of a whole which we may call national strategy. We may get a clearer conception of this fact by realizing that nothing is of any importance in war except as it influences events on land. All the fleets in the world may meet in battle and destroy each other and the result be as nothing if that battle does not change what is happening or is to happen on land. In other words, the Navy is important solely because it does influence events on land. Naval strategy always has an objective related to land operations. Even when the war is one purely of economic pressure exerted by blockade the acts of the blockading force derive their importance from the effects they have on the enemy people. They may be partially starved in consequence. They may realize the hopelessness of resistance; whatever the effect may be, it is the effect on those who live upon or operate upon the land that counts. Naval strategy deals with sea methods but finds its reward in land successes. Too often the casual thinker says it is the business of fleets to fight each other and then assumes he has said it all. Back of every sea battle there is a definite object and that object bears a direct relationship to land warfare. Take the battle of Jutland. Why should either side fight? Germany desired access to the sea that she might do two things, starve England out, stop supplies from reaching her enemies and open the road for those supplies to her own ports. Both were land objectives. So, too, England thought of the land—her distant possessions, her armies in France, her vast populations dependent on food that came to them from overseas. The method was a sea method—its object

a success on land. The Germans required a smashing victory to gain their object. They failed to get it. Supplies and troops continued to pour into the allied countries from overseas and none came to Germany by sea except across the Baltic.

I desire specially to emphasize and to reiterate that the fundamental job of navies in war is to control, for the benefit of those on land, all that happens at sea. Naval strategy must so arrange during peace that in war forces may control the sea quickly, constantly and well.

We in the United States are not fully alive to this necessity of conducting naval strategy during peace. This backwardness arises from the fact of our geographic isolation. We feel a certain security in the United States that other great powers, except Japan, cannot feel because the other great powers are close to each other. In consequence we let many valuable opportunities for improving our strategic position go by. We give greater freedom to our idealism and generosity than other powers and suffer in consequence. . . . Let us glance at peace strategy at work.

A few days ago a reporter representing a London daily paper came to me with a cablegram requesting a statement from the Navy Department as to why the Navy Department was so insistent upon giving increased range to the turret guns of our battleships and stating further in the telegram that in London this looked to them (the London paper) like rivalry in armaments. This statement by the London paper was a part of a rather persistent pressure on the part of the British press to make the United States Navy abandon a move by which it could bring its battleship fleet into a condition reasonably near equality with the British battle fleet. It was good British peace-time strategy to agitate this question with a view to keeping us weak and the British Navy strong against the day, if it ever unhappily came, when those two fleets faced each other. I do not believe those fleets will ever face each other but when the British effort is directed toward keeping the American battleship fleet inferior to their own, I am not ready to acquiesce nor to see in their concern regarding rivalry in armaments anything other than a desire to keep our battle fleet inferior to the British battle fleet.

There are two ways of getting superiority; one is by making

your opponent weak, the other is by building up your own strength. The Navy of the United States has not laid down any new ships, except destroyers, since the war. It has not made any attempt, nor have I heard of any attempt on the part of Americans or of the American press anywhere to interfere with or to criticize naval programs of foreign powers. In spite of this fact there seems to be a decided tendency on the part of foreigners to criticize every move of the American Navy toward efficiency of material and a corresponding tendency to explain increases in foreign armaments by offside reasons, such as unemployment, necessity for preserving the shipbuilding art, etc. Every naval officer knows that these reasons are not the true reasons and that every time a naval ship is laid down abroad, it is laid down for the sole purpose of increasing the strength and power of the navy laying it down. Every American naval officer knows moreover that each time such a ship is laid down and isn't met by corresponding construction for the American Navy, the American Navy becomes weaker and less able to defend American national interests.

The British light cruiser program is a case in point. There are two proposals concerning this program which have appeared in the press; one is for the building of sixteen light cruisers very quickly to replace what is known as the *County* class of cruisers. It was stated that these would be 10,000-ton cruisers, carrying 8-inch guns. Now it so happens that cruiser seems a rather harmless term—as if a few cruisers more or less wouldn't matter in estimating the naval strength of any great naval power. As a matter of fact the 10,000-ton cruiser of today is stronger than the battleship of the days of the Spanish War. Two modern 10,000-ton cruisers could have defeated the entire American and Spanish Fleets combined that fought at Santiago that Sunday morning of 1898.

When the new program of fifty-two British light cruisers was announced by the First Lord of the Admiralty in the House of Parliament some weeks ago, every American naval officer knew that those cruisers would mean the battle superiority of the British Fleet unless America took some steps to meet that huge program. The world is wide and our interests extend all over it. Fifty-two 10,000-ton British cruisers, if unopposed, can

damage those interests at pleasure, in many waters, can control all distant areas while America trusts in the selfish benevolence of the foreigner. It is peace strategy for the British to build those cruisers because dominance of the sea is a basic British policy. That policy runs counter to American interests.

It seems to American naval officers, who have no desire to see their own Navy or their own people go into competitive armament, but still believe in equality with the greatest, that the best way to settle the cruiser question is for America, Great Britain, Japan, France and Italy to repair the defects of the Washington Treaty by an agreement which limits cruisers and submarines and destroyers in the same manner and in the same ratios that battleships and airplane carriers are limited.

Peace strategy was in operation again when the Japanese Government, at the conclusion of the Washington Conference, abandoned a large part of its current building program and decided on a new program of practically equal tonnage, which has later been increased, of vessels to meet the new condition brought about by the treaty. Instead of building small cruisers they decided to build big ones; instead of small submarines, they decided to build big ones. This change was for strategic purposes. Previously they had considered their navy as a navy for the control of home waters but now they saw themselves as one of three great naval powers to whom the control of the sea had been assigned by the terms of the treaty. They deemed it expedient, therefore, to modify their existing building program so that the new ships would be built to operate in distant waters. This was very sound strategy on their part and no American has any right to complain because they adopted it. It was wisdom applied to a national ambition.

Peace strategy deals also with developed and fortified naval bases. One of the great strengths of the British Navy is the fact that wherever its ships go they find fortified, defended bases to receive them and to minister to their wants.

The Caribbean Sea and Gulf of Mexico serve very well to illustrate some of the principles of strategy which the Navy has to consider. Let us consider first the strategic importance of the Panama Canal. A great deal of loose talking has been done as to the effect of the Panama Canal. One statement was that its com-

pletion would double the fleet of the United States. Of course that is an absurdity. The size of the fleet of the United States needed in any given war depends not upon the canal but on the number of ships of an enemy that it will have to fight and where it will have to fight them. That is, it is a pure question of strength on the field of battle plus strength to defend the commerce of the United States in distant waters. The canal could not double the number of ships but it could make them doubly useful if we had only one enemy at a time. With the fleet in the Pacific and the canal in existence, we are able to transfer the fleet to the Atlantic probably in time to meet an enemy. In the same way if the fleet were in the Atlantic we could transfer it to the Pacific quickly. Without the canal we could not depend on the transfer of the fleet from one coast to the other as a war measure because it would take so long and be so hazardous an undertaking that the enemy might cripple us at sea meanwhile.

The canal really gives us freedom to use the fleet on either coast at pleasure and does not permit any other power to interpose between two sections of the fleet if we maintain all of our fleet in as high a degree of readiness as that of any fleet which may be hostile to it. Without the canal we could not have as great security at sea unless the Navy were made bigger.

Another statement that has been made is that the canal has doubled the need of a navy. This statement is even less true than the other one. Every increasing need for a navy is derived from our increasing world responsibilities, from our increasing dependence upon what happens outside of our territorial limits to influence our prosperity and well being. These world responsibilities and outside interests are so great that a navy big enough to take care of them is fully capable of doing its part in taking care of the Panama Canal. The canal is a great naval asset and not a naval liability—it is a real element of strength. It is a time-saver.

It is a favorite statement that certain naval positions, harbors and naval bases control certain areas. This statement is likely to be misinterpreted, because positions do not control—they simply make control possible. The control is exercised by the forces that operate from these positions and bases. For instance, our naval base at Key West, if used by a sufficient naval force, can

Official Photograph

SCOUTING FLEET IN GUANTANAMO BAY, CUBA

control absolutely every movement of ships, except submarines, into the Gulf of Mexico via the Straits of Florida. In the same way our naval station at Guantanamo is admirably placed for the control of all the ships that would desire to pass between Cuba and Haiti. Culebra also, is so situated that a force based there can easily make it so dangerous for ships to traverse the Mona Passage or to enter the Caribbean Sea from the eastward that they will not attempt it.

Of course the sea is big and it may look as if ships would willingly undertake the hazard of entering an area watched by ships based at Culebra and Guantanamo and Key West, yet if those ships were active, strong and well handled, there is no doubt that they would be able to stop all enemy ships from traversing those waters because every military force and every enemy ship in time of war must consider the possibility of retreat. No one wants to run into a cul-de-sac.

Imagine an enemy cruiser, for instance, passing through the Straits of Florida to operate against our commerce in the Gulf of Mexico. The instant it has passed those straits, it realizes that it never can get out without meeting some of our vessels in the Yucatan Channel or in the Florida Straits and that it must fight when the meeting takes place. In the same way if our fleet were based at Culebra and an enemy fleet attempted to operate inside of the Caribbean Sea, no matter where, our position at Culebra between that fleet and its own home country and all its supplies would make it certain that the enemy fleet would operate in the Caribbean for a very brief time and its operations would be terminated by battle. These facts indicate the meaning of the control exercised by naval positions.

Our acquisition of the Virgin Islands was an example of American naval peace strategy. We did not need the Virgin Islands for our own use but it was highly undesirable that any other power should be able to get possession of them and establish there a naval base. We, therefore, paid twenty-five million dollars, and assumed an annual cost charge of over a quarter of a million dollars to prevent such a happening.

In considering the naval strategy of the Caribbean, we have to take into account four great harbors of the Caribbean. Modern conditions are such that fleets require very large harbors that are

practically land locked—that is almost surrounded by land. The great harbors of the Caribbean area are Samana Bay, admirably located for a fleet defending the Caribbean area; Culebra and Vieques Sound, still better located for defending and controlling the Caribbean area but not quite so well enclosed by land; the Gulf of Paria, a harbor too far away from the main lines of commerce to be as valuable as either of the two just mentioned; Chiriqui Lagoon, not far from the Panama Canal, admirably adapted for the use of a fleet operating locally either against or in defense of the canal.

In the days of sailing ships in the seventeenth and eighteenth centuries, when the Caribbean and Gulf of Mexico area was even then of great commercial interest, the strategy of the Caribbean was somewhat different from the present time. The direction of the wind and the direction of ocean currents had a marked influence on the strategy of the day. The two great bases established by Spain at that time were Cartagena and Havana. The prevailing wind during the large part of the year was northeast, enabling ships easily to sail into the Caribbean to Colon. Their natural course was by Cartagena where they could replenish their supplies and where they were secure by the fortifications of the fort from attack. A smaller defended harbor was at Porto Bello near Colon where merchandise was exchanged for the gold drawn from Spanish America. When the ships were ready to go home from the Colon region they had head winds until they got back to Cartagena and from there laid their course northwestward to the Yucatan Passage, with a fair wind, until they were in the Gulf Stream and were able to make their way out by way of Havana and the coast of Florida. This route of the sailing ships made Cartagena and Havana objects of attack when Spain was at war.

An attack on Havana made by Admiral Pocock of the British Navy in 1762 is interesting as illustrating the application of strategic principles to the special conditions of the day. Admiral Pocock arrived at Cape Saint Nicholas, the northwest corner of Haiti, in May of that year with a convoy of troops to attack Havana. The usual course of vessels bound for Havana was to sail along the south shore and west end of Cuba up to Havana. This course was somewhat longer but it avoided the dangers of

navigation through the Bahama Channel. Admiral Pocock realized that time was highly important if he was to surprise the Spanish garrison. Further, he wished to cut off, if possible, supplies that might be en route to Havana at the earliest possible moment. He, therefore, decided to take his 200 ships through the dangerous Bahama Channel. There were no lighthouses in this channel at that time, so his problem was how to keep his ships from running aground. He solved it with complete success by sending fast sailing vessels of his fleet ahead of it to anchor on the shoals bordering the channel and hoist special lights at night so that his heavier and less wieldy ships had nothing to do but sail down the well lighted channel. He brought his fleet through without the loss of a ship, invested Havana and captured it.

Cartagena was of special interest in the seventeenth and eighteenth centuries because of the frequency with which it was attacked and sometimes taken. Its harbor had two entrances, one wide and commodious and the other narrow and dangerous, through which but a single ship could pass. After the city had been captured three times by ships that entered through the wide harbor entrance, they decided to fill that with stone so as to shut out enemy ships. That proved to be a very efficacious move.

Admiral Vernon of the British Navy attempted to attack Cartagena in 1741 expecting to get great booty there. Just previous to his attack on Cartagena, he had taken Porto Bello near Colon with comparative ease. For this act he had received thanks of Parliament, but when he appeared with a convoy of troops before Cartagena he had a very difficult job to undertake. There was lack of cooperation between the troops and the fleet due to the personality of Admiral Vernon. Captain Marryatt in one of his stories speaking of this attack on Cartagena said: "The Army thought the Navy might have beaten down the stone ramparts ten feet thick and the Navy wondered why the Army did not walk up the same ramparts which were 30 feet perpendicular." The attempt failed because of lack of army and navy cooperation and because of the stoutness of the defense.

A long series of incidents bearing on this subject of cooperation has led the Army and Navy of the United States to organize for complete cooperation. Our experience in the last war has demonstrated that we can cooperate fully and cordially and effectively.

Some idea of the importance of operations of the British and the French and the Spanish in the Caribbean area during the Seven Years' War may be had from the fact that in the year 1760 Great Britain had 8,000 merchant ships at sea, that during the Seven Years' War the French captured 1,400 British merchant ships in the Caribbean Sea and Gulf of Mexico alone, and that during the war Great Britain lost a total of 2,500 merchant ships. In spite of that she won the war. France, on the other hand, lost 950 merchant ships in the same time but lost the war.

There is an interesting fact connected with this Seven Years' War that I will mention as it bears on recent events. By the treaty of peace, France gave up the right to erect fortifications and to keep troops in Bengal. She has no Bengal now.

The development of aviation in the last decade has had an important influence on the location of naval bases. Perhaps I can best explain this influence by illustration. During the latter part of the World War after our North Sea Mine Barrage was in operation and nearly completed, the question arose as to what further mining operations the American Navy might engage in so as best to hamper the German and Austrian submarines in their attack on allied commerce. It was decided to lay a mine barrage across the Straits of Otranto so as to shut the submarines out from their Austrian bases in the Adriatic Sea. After determining upon this mine barrage it was necessary to select a mine base. There were several propositions put forward as to the location of this base. Various positions near the Straits of Otranto were considered, among those Cephalonia, a Greek island on the west coast. Manifestly a mine base could not be expected to serve its purpose if it were subject to bombardment from the air by aircraft. A further study of the situation demonstrated that it would be very unwise to build a mine base at Cephalonia because it was within comparatively easy airplane flight distance from Austrian territory. The decision that was taken in the end was to build the mine base at Bizerta on the African coast south of Sardinia. This choice was made solely because it lay outside of any possible attack by German or Austrian aircraft. You see there the influence of aircraft on the location of bases. Their influence constitutes a new element in naval strategy.

You are all familiar with the fact that the Germans were pushed out of their submarine bases on the Belgian coast by air activity. This means that in the future whatever naval bases the United States map develop must be located in positions fairly secure from enemy air attack.

There is one principle in strategy which I haven't mentioned and which seems to be rather obvious to anyone and that is thoroughness in whatever strategy is undertaken. Half measures are likely to fail. I will illustrate by the history of our North Sea Mine Barrage. The object of that barrage was to shut out German submarines from the high seas so that commerce everywhere would be free from their activities. Obviously a barrage entirely across the North Sea was a necessity—if gaps were left in that barrage, ultimately they would be discovered and used by the submarines. In spite of the obvious necessity for a continuous barrage, very serious difference of opinion arose between British and American naval officers in the laying of that barrage. The British modification of the American plan at first left wide open a channel next to the coast of Norway forty miles wide through which German submarines would be free to come and go, and a similar channel off the coast of Scotland forty miles wide where German submarines might also come and go. The only place where mines endangered them on the surface was in the middle of the North Sea. This arrangement was repugnant to American strategical ideas and every American naval officer associated with the mine barrage insisted from the start that the barrage should be complete, and that wherever a submarine hit that barrage, either on or below the surface of the water, it should be in danger of sinking. It required constant pressure for months to overcome the British objection to this solution. It was finally accepted and you know the results.

I once saw the broadest, most comprehensive features of naval strategy exemplified in a very simple manner. In the winter of 1915 I was cruising down the west coast of Africa looking for a corrugated iron roof to show through the cocoanut trees and tell me that I was near the port of my destination when I sighted a long line of native dugout canoes stretching from a thatched village on the beach far out to sea. In each canoe there were two natives and two rifles. Near by were other canoes rolling

lazily about carrying other natives who were peacefully engaged in fishing.

The tribe was at war with two other neighboring tribes, one to the north and one to the south. The jungle between those tribes was practically impenetrable—no fighting was possible in the jungle. The tribe to the south depended largely on fish for food. The tribe to the north needed rice from the south. Neither of these tribes were very good at canoe building or at handling canoes, so when one of them went for fish or the other for rice by sea as they were compelled to do, the seagoing tribe, the one with the long line of canoes stretching seaward, attacked their enemies and some days afterward those venturesome food seeking canoes would drift on to their own shores bearing the headless trunks of their late occupants. When I came to that line of canoes it was lolling lazily in the sun and security reigned in the village on shore while the men got ready to deliver by sea the *coup de grace* to their enemies. It struck me then that there before me were spread out the fundamentals of naval warfare; to use the sea for one's self; to deny its use to one's enemies; to guard one's own shores, and finally if no other means will serve, to attack by way of the sea. No books, no generals, no admirals had taught that native tribe its strategy but the stern struggle for existence had led them to the sound application of strategic principles adapted to their special environment.

Thus, in time of war, the theater of which may be all the seas and where the sources of food and raw materials may be the four corners of the globe, the effort must be to close all those seas to enemy use and to keep them open for our own use. There is just one final, one conclusive way of accomplishing this mission and that is by the destruction of enemy fighting ships wherever they may be. All other methods are palliative, not conclusive. In this fact lies the reason for the constant insistence by naval officers on fighting ability as the primary consideration in every type of ship, and the further insistence on at least equality in numbers. Like most other Americans we are willing to back ourselves if we have a 50-50 chance.

THE PROPOSAL FOR A UNITED AIR SERVICE

By Captain A. W. Johnson, U. S. Navy

THE SUBJECT of a united air service or of a department of the air or of some other form of amalgamation of the present air services of the United States into a single organization has been discussed at length at congressional hearings and in the press, and has been given careful consideration by the War and Navy Departments as well as by the President of the United States in 1922. The result of these hearings and studies has been that no official sanction has ever been given by either the War or the Navy Department or by the President to the proposal, but that, on the contrary, the proposal has been deemed an unwise one.

At first glance the proposal may give the impression of being efficient and economical, especially to one having no intimate knowledge of the activities of the army air servce and of the naval aeronautic organization. The proposal appears to have advocates of two classes, those who, lacking complete knowledge of the military and of the naval duties of aviation, believe that amalgamation would be advantageous to the government, and those who, for personal reasons, see in amalgamation opportunities for increased rank and increased pay.

I shall endeavor to show you that national, as opposed to personal, interest demands that the aviation branches of the Army and of the Navy must be integral parts respectively of the service with which each would ordinarily work in time of war. Officers of naval aviation are practically unanimous in this opinion and hold to it in spite of the fact that many of them might get increased rank and increased pay by the adoption of the proposal. This opposition to the proposal on the part of naval aviators and naval officers in general is based on their knowledge of the impossibility of meeting those needs fully and efficiently except by the Navy itself. It is this unselfish view of naval officers that I desire to explain to you. I believe it to be

sound and I desire here to express my complete belief in the statement that national interests demand a separate naval aviation force.

I understand that there is a similar opposition to the proposal, and for the same reasons, on the part of the War Department and the great body of trained and responsible army officers, both within and without the air service. In what I have to say, however, I shall not deal with any except naval aspects of this question.

What relation has the army air service to our national defense, and what relation has naval aviation to our national defense?

I do not think we can come to any correct decision regarding the organization of our aviation forces without a thorough understanding of what those forces would be required to do in case of war, and such understanding must be derived from a study, not only of the possibilities of aviation itself, but also of our national situation, our geographic position in the world. Our government, like every other government, must prepare to defend itself in two general localities, at sea and on land. The Navy is for the defense at sea, and the Army is for the defense on land.

It so happens that our geographic position in the world, 3,000 miles of water separating us from the nearest great power, throws the burden of the first defense and, we hope, the final defense against aggression on the Navy of the United States. The Army can never act against such aggression unless the foe breaks through the defense of the Navy first, or, in case of aggression on our part, unless the Navy carries the Army overseas.

The present state of development of aircraft is such that a shore based air force can not act offensively against a nation overseas unless it is first carried across the sea in ships. A shore based air force will not be called upon to act defensively against the enemy's ships until the Navy has failed in its mission of keeping them at a distance. What the future developments of aircraft may be no one can foresee, but from present indications, it is unlikely that aircraft will ever be able to operate overseas without the use of ships. From the standpoint of national defense these facts point out the supreme importance of naval efficiency in all its branches.

Centuries of naval experience have unfailingly demonstrated that the completest possible teamwork within the naval service is indispensable to success. Naval aviation and naval aviation activities associated with the navy have come to be absolutely necessary to the Navy if it is to be efficient for war.

This brings us to the question of what naval aviation really is.

What Naval Aviation Really Is

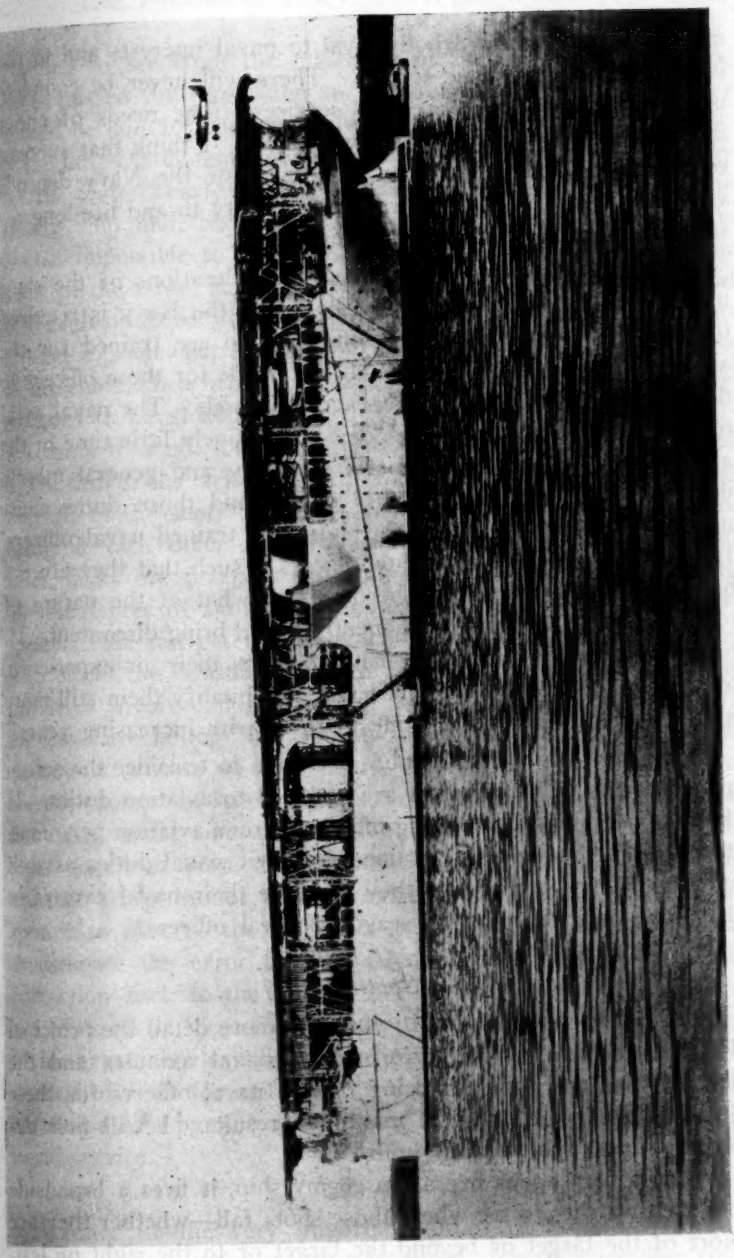
The present plan for the peace time organization of aviation in the United States Navy calls for the following: On each battleship, one observation plane and two combat planes; on each light cruiser, two observation planes; on many destroyers, one combat plane each; on some submarines, one observation plane each; on 135,000 tons of airplane carriers, as many planes suitable for scouting, attack, observation and combat as it is possible for them to carry. In addition, scouting seaplanes accompanied by tenders; training stations on shore; other stations at strategic points for the maintenance of naval aircraft in support of fleet operations.

You will note from the above that, as planned, there is an intimate association between naval aviation forces and the fleet.

Loyalty

One of the first problems we have to consider, then, is how to make the aviation personnel thus intimately associated with the fleet most efficient for fleet purposes. The question of loyalty is the first one that arises. If the aviation personnel is a part of the fleet, a part of the Navy; if all the future career of that personnel is wrapped up in the success of the Navy; if their life is to be a naval life, their thought will naturally become exclusively naval, the same as the thought of any other naval officer. They will think of naval success as their primary mission. If, on the other hand, they belong to a third service, not of the Navy, their primary thought is not with the Navy, their keenest efforts are not devoted to the Navy, but what, to them, is the primary organization—the United Air Service. They look forward to the time, perhaps, when they will not have to go to sea but will train and live in another environment, perhaps a softer life.

Then there is the question of serving two masters. One can



U. S. S. "Langley," Showing Flying Deck

not be completely and wholly loyal to naval interests and to the interests of a united air service. There will never be complete understanding between the two services. The needs of either the one or the other must take precedence. I think that success, coordination, efficiency of the air service of the Navy depends very largely on this idea of complete loyalty to and life-long association with the Navy and its aims.

There are other somewhat minor considerations of the same nature which may be mentioned here. If the Navy is required to use, in its aviation service, officers who are trained for the air alone, then it will have insufficient work for those officers to do when they are attached to seagoing vessels. The naval aviator on board ship actually spends comparatively little time in the air. So the interests of general efficiency and general morale demand that he be given other duties, and those duties must necessarily be naval duties, the duties of trained naval officers. If the training of the individual officers is such that they are not fitted for these duties, they become somewhat of the nature of idlers on board ship and consequently would bring discontent. If, however, they are themselves naval officers, their air experience, in addition to their naval experience, will qualify them still more highly for the ranks that come to them with increasing years.

Flying is a young man's job. We have to consider the subsequent careers of officers that are assigned to aviation duties. If the Navy supplies from young officers its own aviation personnel, it sees to it that they are trained for their naval duties as well and that at the proper age they continue their naval careers in the more normal duties of seagoing naval officers.

Spotting

I desire now to point out to you with more detail the principal duties that have to be performed by naval aviators and the necessity we are under of using trained naval officers for these duties if we are to get the maximum results. I will first describe to you spotting of gunfire.

When a ship opens fire at an enemy ship, it fires a broadside and then watches to see where those shots fall—whether they are short of the target or beyond the target or to the right or left. If the target is close by, it is quite easy for an officer of ordinary

training to see from the masthead of the ship how much the shots missed the target and to telephone to the guns how they should be laid for the next salvo in order to hit the target; but if the target is distant the splashes made by the shots when they hit the water nearly always appear to be on the line with the enemy ship and, because of the curvature of the earth, it is almost impossible to tell how much those splashes are over or short of the target ship. It therefore becomes necessary to send men high up to see the ship and the splashes made by our shots around it, somewhat as one looks down on a map. This spotting of the shots when firing at great range is a duty which has to be assigned to naval aviators.

I think it is not too much to say that battles may be decided by the skill or the lack of skill of officers aloft in airplanes spotting the fall of the shots of their own fleet. When single ships are firing at each other the problem is comparatively simple, but when fleets are firing at each other, spotting requires the very highest degree of skill and judgment on the part of the aviator-spotter. He can get this judgment only by constant association with fleets, by constant practice and by constant study of the problems involved. The aviator has to judge not only where the shots are falling but he must communicate to the firing ships changes of course of the enemy, changes of formation of the enemy, changes of speed of the enemy and any other information that may assist our ships and our fleet toward victory. He must do all of these things with the utmost celerity. It is no unusual thing in our present aviation service for an aviator-spotter to observe the fall of a salvo of shell near the target, to estimate the error of that salvo in range and to radio the correction back to the ship in five seconds' time. The aviator has to do all of these things under the pressure of the knowledge of his great responsibility. I believe that it would be taking the gravest of risks for us to expect or to demand that duties of this nature be done by officers belonging to any service other than the naval service.

Scouting

Another of the very important duties of naval aviators is scouting. At present scouting by naval aircraft operating from ships is not likely to be carried on more than two or three hun-

dred miles from their parent ships. We have no naval aircraft as yet, nor has any other government, suitable for prolonged scouting operations independently of mother ships. When the Navy sends an airplane into the air to search for the enemy fleet, it is essential that the officer who is to get the information should be able to evaluate, to know what it is that he sees. Anybody aloft can say that he sees a ship or a group of ships but it takes experience to know what kind of ships they are, what they are doing, what the significance of their formation is and what relation those ships bear to the intentions of our own fleet. The scouting operations that are of the highest importance are those that precede battle. No one can foretell which aviator will be the one to report to the commander-in-chief the presence and the formation and position of the enemy fleet. Whoever it is that makes the discovery will see much but must report it in a very few words. He will need a background of naval knowledge and experience as a naval officer that will enable him to pick out the essentials of what he sees and send them through to the commander-in-chief in a very few words. He will see changes in the enemy's formation, movements which, to the untrained officer, might be meaningless but which to the trained naval officer would convey information of the highest importance. It will require a knowledge of naval strategy and of naval tactics for that aviator to interpret correctly to his commander-in-chief what he sees.

A naval aviator aloft on scouting duty is not a chauffeur driving a machine, but more of the nature of a general overlooking the field of battle, grasping the essentials of what he sees and telling his commander-in-chief in order that he, the commander-in-chief, may take suitable action at once. If he sends incorrect information, falsely interpreted information, to his commander-in-chief, his act may be followed by the gravest consequences. I believe it would be highly contrary to our national interests to entrust duties of this nature to any but trained naval officers.

Attack

The third mission of naval aviation is the attack of enemy ships and here again judgment of a high order is required. The naval aviator must know which are the essential ships to attack

and must be able to recognize them from the air. He will not have spread before him a simple picture, easily recognizable in its details, but he will have to select his target, judge its course and speed, and importance to the general engagement through a mass of smoke and through confusing elements that will make his task extremely difficult. As a rule he will carry but one or two bombs or but one torpedo, which will mean that for that particular engagement, as a rule, his first attempt must be successful.

Another duty closely allied with the attack duty is that of laying smoke screens from his airplane. To do this successfully he will have to operate in conjunction with other airplanes and will have to adjust his acts and the movements of his plane to the enemy fleet. His problem will not be to lay a smoke screen in a certain place, but to lay it so that when the fleets arrive in a certain position the smoke screen will be so laid as best to support the efforts of his own fleet. This act will require judgment and naval knowledge of a high order. It could never be expected from any officer not trained as a naval officer, not continuously associated with men of the naval profession.

The attacks must not be isolated or independent affairs, but must be co-ordinated in time and method with the general plan of the naval commander-in-chief. Only careful training and long practice will develop the necessary teamwork among the component arms of the fleet to insure their harmonized working in the general engagement.

Communications

The important rôle which radio communication plays in naval operations is another reason why it would be very unwise to trust duties so intimately associated with the success of our fleet to other than officers of the Navy especially trained for the purpose.

The various units of the fleet must always be in touch with one another. This contact is based on a complex system of intercommunications of which radio constitutes an essential part. It is complete in itself. It involves intimate knowledge by each one of its elements of the workings of every other element of the system. The entry of an extraneous element, not intimately

associated with the workings of the system, is apt to have a decidedly unfavorable effect on the efficiency of the entire system. In the case of the radio service, this unfavorable effect would be particularly noticeable. Only the personnel of the navy radio is capable of giving efficient service in connection with naval operations. No other personnel could do as well because such service requires intimate knowledge of the workings of every branch of the Navy.

Types of Aircraft

There is a widespread opinion that naval and military aircraft do not differ greatly in types, but this is not true. In the first place the Navy operates over the water almost exclusively while the primary duty of the Army is operations over land. Naval aircraft that are forced to alight on the land are likely to be wrecked and army aircraft that alight at sea are likely to be lost. It is true that the Navy uses aircraft that alight on wheels but even in this type the naval aircraft must be especially built for this purpose because of the peculiar requirements of the Navy. Wheeled aircraft used by the Navy must be capable of being shot from catapults on board ship and must be built strong enough and designed especially with a view to alighting on aircraft carriers and being stopped after alighting within a very short distance. The Army, on the other hand, use the length of the field to get into the air and the length of the same field to come to rest after alighting. It is not too much to say that naval aircraft must get into the air in one-fiftieth of the distance the Army uses and must come to rest after alighting on board ship within a hundred feet where army planes would probably use several hundred feet in coming to rest. There are other requirements of naval aircraft that make their type distinctive. For instance the Army is under no necessity of limiting the length of the wings of aircraft whereas naval aircraft that go to sea on ships must have those wings adjusted in length to the place they are to be carried on board ship. As the number of naval aircraft carried on ships will always be limited, the Navy is under necessity of designing aircraft adapted for several purposes, such as torpedoing, bombing and scouting. Efforts are now being made to design a single plane capable of performing

all three functions. Operation of naval aircraft involves a thorough knowledge of the making of nautical and astronomical observations, for which purpose naval aircraft must be equipped with special navigational instruments, whereas land planes as a rule navigate by maps. These distinctions of naval aircraft illustrate the necessity of constantly regarding naval aircraft in their relation to the ships from which they are to be operated.

Aircraft Carriers

The effectiveness of these carriers for war purposes will depend very largely upon the seamanship of the aviators attached to the carriers. Questions of the handling of planes alongside the ship, the hoisting them in and out of the ship, of stowing them on board ship, of repairing them on board ship, of tuning them up, the general sea life of the personnel of the carriers will determine very largely whether they are successful or otherwise. Naval experience indicates that no one sent to sea to do ship duty is efficient until he has been trained for a long time on board ship. This necessity for naval training will be especially important for all those officers who are attached to aircraft carriers. From the standpoint of controlling the manufacture of naval aircraft and aircraft carriers it would not seem to be advisable to vest this control in separate and distinct departments of the government. The design of aircraft carriers and that of naval aircraft are so closely interconnected that their manufacture should be controlled by the same department: i. e., the department which controls the building of all naval ships.

Independent Action of Air Forces

One of the principal reasons that has been adduced for a united air service is the belief that action by air forces independent of land and sea forces is likely to be important in time of war. I have already pointed out in the beginning of this discussion that our geographical position precludes such independent action. However, should it ever happen that our air forces would be in striking distance of enemy forces, even then, independent action of air forces is not likely to be profitable. We have found in naval war experiences that it is the concentrated attack that counts. Successes gained by air forces are fugitive

unless they can be immediately followed up by ships or troops. It is during a battle of land or sea forces that aircraft display their most efficient function. A ship that is attacked at sea by bombers, when free to defend herself, is quite safe from such attack because she may give her whole attention to repelling it by anti-aircraft guns and with her own aircraft, but where a ship is engaged at the time in battle with other ships, her ability to defend herself against air attack is lessened. It is then that assistance of naval aircraft becomes of vital importance: i. e., when it can be coordinated with the entire plan of the battle.

I do not enter here at all into the question as to whether or not army aircraft should be allowed independence of action. That is a matter for military authorities to settle. I am merely pointing out that such independence of action will afford no benefits to the Navy. There will, of course, occur occasions when naval air raids may be made for a specific purpose.

The above are some of the reasons why I am opposed to a united air service. I believe that any one of them more than overbalances any just claims that may be made in favor of a united air service.

The Navy Department is Responsible for the Design of Naval Aircraft

The general design of an airplane to meet some military or naval need rests upon distinctive characteristics of these respective needs.

Aircraft for naval purposes depend so much upon general naval tactics and naval construction that a decision as to the required characteristics may involve an estimate of the situation as regards some phase of gunnery, torpedoes, fire control, underwater protection, horizontal armor, gas warfare, ship ventilation, anti-aircraft guns, launching and handling facilities, bases, storehouses, and tenders, besides purely technical aviation matters. For example, the principal feature of a bombing plane is the type of bomb to be carried. Should we carry a one-ton bomb, or two half-ton bombs? To answer the question, the relative effectiveness of different types and weights of bombs must be considered with reference to the proposed targets. If the target be a battleship, the question involves an inquiry into the probable

Official Photograph

PUTTING MOORING MAST ON U. S. S. "PATOKA"

protection the battleship can be given on deck and below water. Furthermore, to decide whether the bomber should be given a high ceiling (ability to bomb from a high altitude) at sacrifice of some other characteristic, one must consider the anti-aircraft measures which are probably to be encountered.

Similarly, the characteristics desired in an observation plane are largely determined by the fire control doctrine of the fleet while, at the same time, the possibilities of the airplane must be considered in forming that fire control doctrine. None but naval officers familiar with all sides of the question can do better than make a more or less intelligent guess. An accurate estimate of a situation involving an intimate knowledge of such broad fields as aviation, gunnery, tactics and naval construction is clearly beyond the scope of one man's mind, but quite within the capacity of the Navy Department. The agitation for a separate air service appears to be based on, as yet, unproved theories, and seems to ignore the very important material difficulties which are not eliminated by simply ignoring them. Some of these difficulties have already been pointed out. To such material difficulties should be added another vital consideration, and that is the responsibility of the Navy for the success of its actions. This responsibility may legislatively be shifted upon the shoulders of another department, but neither the necessary knowledge nor the final responsibility can actually be so transferred.

The Royal Air Force and the British Navy

Among the arguments advanced by proponents of a single air service are that consolidation of army and naval aviation will promote the development of aviation in the United States, reduce the cost of production of aircraft, and insure greater economy in the administration and operation of our national aviation activities. They point out that for these reasons Great Britain consolidated the Royal Naval Air Service and the Royal Flying Corps into the Royal Air Force under a separate department with its own cabinet officer. As a result of this they claim that aviation has gone ahead in England whereas in America it has fallen behind.

Let us look into some of the facts. The amalgamation of the Royal Naval Air Service and the Royal Flying Corps took place

on April 1, 1918. The critical conditions in England at that time are still fresh in our minds. They were a deciding influence upon those responsible for the creation of the Royal Air Force. The naval war was practically over, the submarine campaign was already doomed to collapse, and the German High Seas Fleet was powerless. On land the situation was very different. The allied armies were in a desperate situation, England was within bombing distance of the German aviators, and victory was by no means assured to the allied cause. It was, therefore, perfectly logical that the British Army should call upon the Navy for such reinforcements as were not absolutely necessary at sea. The British Army was deficient in aircraft, and the Navy was well supplied with aircraft. In view of the fact that the naval war was practically over, urgent consideration was given to the best method of procedure to reinforce the hard pressed armies with naval aircraft. The result was the amalgamation of the two services into a royal air force. The two forces were amalgamated because it was not considered practicable to loan the naval air service to the Army and have the navy personnel work under the direction of army personnel. It was feared there would be friction with resulting inefficiency. It was a military necessity of the time, and the British Navy fully alive to the situation therefore gracefully acquiesced in the amalgamation, realizing that it was a temporary expedient.

But, the emergency created by the war having passed, the First Lord of the British Admiralty in the naval estimates for 1920 and 1921 reported as follows:

> So far as can be foreseen naval requirements will be met by the proposal ultimately to form a naval wing under the Air Ministry with a personnel especially trained in naval work.

The foregoing indicates that all was not well, and that aviation was not fulfilling the requirements of the navy. Subsequent representations by the Royal Navy and by the British Army disclose the fact that the opposition to the existence of a royal air force by the Army and Navy was steadily growing with the realization that the respective services should control such air units as were allocated to them. The Navy, particularly, was dissatisfied with the progress made in naval aviation, and it was felt that the fleet was being deprived of one of its most useful weapons.

The First Sea Lord, Admiral Sir David Beatty, recently (summer of 1923) intimated that he and his professional colleagues would feel bound to resign unless the navy should control such aircraft as are an indispensable part of the purely naval equipment of a modern fleet. Since then the Admiralty has been given partial control of the flying army afloat and some supervision of training for sea reconnaissance. Undoubtedly this has improved the naval situation in England, but it is only a temporary expedient and the problem there is still far from a satisfactory solution.

But even had consolidation of all branches of air service in England proved to be successful—which apparently it has not—it would not follow that such a consolidation is to be recommended in the case of other countries where the conditions upon which the idea of consolidated air service is predicated do not exist. The difference in the geographic position alone of England and of the United States is so great that the strategic problems in the defense of the two countries cannot be compared; and, if one bears in mind the peculiar demands upon England which existed at the time of the formation of the Royal Air Force, and considers that similar motives are entirely absent in the case of the United States, the argument that the example of England should be followed loses all force.

Whatever may be the reasons for the opposition by the British Navy to continuance of the Royal Air Service, it cannot be gainsaid that there, at least, the argument for consolidated air service has a substantial foundation in fact. The World War has disclosed the precarious position of England, exposed as she is to air attacks from all sides, a position from which her navy cannot now completely safeguard the country. England's traditional "splendid isolation" has been destroyed by the expansion of warfare into the realm of air. True, loss of control over naval aircraft is bound to have a detrimental effect on the British Navy; but this detrimental effect, the advocates of the Royal Air Service hold, must of necessity take a secondary place in view of the primary importance of a general air defense. The geographical position of the United States makes a similar situation impossible here. The United States, unlike the British Isles, is not open to easy air attack, nor is it

likely that future development of aircraft will substantially change this situation. Independent, concentrated air warfare against this country is not conceivable. Therefore, a separate, consolidated air service in the United States has no reason for existence. On the other hand, the detrimental effect of loss of control by the navy over naval aircraft, which in England takes a secondary place before the air demands of the country as a whole, would, in the United States, assume primary importance, because the United States is bound to rely for her protection, in the first place, on her Navy. Any attempt therefore to weaken this first line of defense by depriving the Navy of its control over naval aircraft would be fraught with serious, if not indeed fatal, consequences.

Economy

As to the contention, also based on the example of England, that consolidation of air service would bring about a reduction in the cost of production of aircraft and greater economy in the administration and operation of aviation activities, a survey of England's situation in this respect does not bear out this claim. Indeed, one of the strongest arguments of the opposition to the continuance of the Royal Air Force is that this service has placed a tremendous financial burden on the government, as shown by the estimates of the Air Ministry.

A reading over of the second report of the special committee on estimates of the British Parliament held in April and May, 1923, will show that the Royal Air Force is duplicating many of the functions of the army and navy. Money is asked for separate hospitals, separate medical corps, nursing corps, air cadet academy, floating equipment, and for separate training stations for boys and men. The air service has its own judge advocate and legal corps for the administration of courts martial, boards, etc. It has its separate financial, accounting and supply organizations and duplicates similar establishments now within the existing organization of the army and navy. There is great waste in personnel, and taking up only the case of aircraft carriers it is shown in the report above mentioned that the personnel on aircraft carriers could be materially reduced with aviation an integral part of the navy. Rear Admiral C. T. M. Fuller states that for every eighteen air officers on the British carriers the number

could be reduced to eleven or less with the flying personnel an integral part of the navy. This is due to the fact that the aviators could be used as watch officers, the ship's regular radio officer could handle the radio, and the ship's supply officer could handle all stores, etc., etc. He says that there are separate clothing stores, separate work shops, etc., the men of the air service being under a different command from the men of the ship. The admiral also states that in his opinion were it possible to do away with the necessity for the separate functions and have all under one command from one service, it would be possible to make space on the carriers for at least six more planes. Clearly, therefore, the experience of England bodes ill for the hopes of effecting economy in the United States by following her example.

In the United States, naval aviation, by constituting an integral part of the naval establishment, is free from the numerous duplication of costs from which England suffers under the régime of a consolidated air service. The existing administrative, industrial and scientific organization of our Navy Department and all of its resources have been taken advantage of in the development of naval aviation, whose foundation rests upon the Navy with little additional overhead over the general overhead charges of the Department. A saving is thus effected in the United States where in England the cost is rising without prospect of stemming the tide.

A few examples illustrating wherein such saving is effected in the United States may make the point clearer.

Aviation is still in a formative state. In no branch of national defense is it more important to keep in touch with modern development. More than that, if the United States is to hold her place among the naval powers, we must continue to lead in such development. In such work naval aviation must be developed along the lines adapted, primarily, to the needs of the Navy. Only the Navy can know what is really needed, and only the Navy, therefore, can take care of such development, as it has done in the past, through unremitting research, investigation, inspection, designing and redesigning, and through the tireless efforts of the officers on whom fall the administration of these numerous functions and the management of established naval agencies.

The development of naval aviation ordnance, as it is today, for instance, has been carried on by existing naval ordnance agencies. The numerous problems involved, such as bombs, bomb sights, guns, torpedoes, smoke screens, are all predicated on a thorough knowledge not only of aviation alone, but of aviation as practiced in and by the Navy: i. e., aviation as an indivisible arm of the entire Navy. This development, which, under a consolidated air service, would require a vast expenditure of money for separate ordnance laboratory and various other technical establishments, has been accomplished practically without cost to the country above that incurred in the general work of the Navy Department. All these activities came within the daily work of the various establishments of the Navy, which exist now and which would continue to exist, whether part of their work were taken away from them or not.

Take the development of naval radio as another illustration. The conspicuous progress of this branch of naval activity is due to the work of the Bureau of Engineering of the Navy. This bureau is here to stay. Its present status would not and could not be changed by taking aviation radio work away from it and transferring such work to a consolidated air department. What, then, would be accomplished by such a transfer? Leaving out other possible disadvantages, and considering merely the question of cost, a part of the work now effectively performed by the Bureau of Engineering without cost outside of the cost which has to be incurred in any case, would have to be done by a new and separate establishment at a great additional expense. The same is true in regard to various other duties of the Bureau of Engineering, such as testing materials, development of engines, etc.

One of the greatest savings in the administration of aviation is effected through the administration of the supply system through the Bureau of Supplies and Accounts. All purchases of material, all disbursing, supply of provisions and clothing, and general accounting for all branches of the Navy, including aviation, is performed by the supply corps. The storage, issue and transportation of aviation supplies for the Navy are accomplished as an incidental function of the bureau. This important service would necessitate an almost exact duplication of the supply corps of the Navy in a separate air force.

In the production of naval types of planes and their development for the work of the fleet, full use has been made of the services of the expert designers and engineers of the Navy. The experienced naval architects of the construction corps of the Navy schooled to the design and construction of modern naval vessels have provided a large part of the technical skill for aircraft development. An example of this is had in the production of service types of planes now with the fleet, in the development of the catapult for launching planes from naval ships, the development of the arresting gear on the decks of airplane carriers, and the building of the airship *Shenandoah*. All of this work has been accomplished by the construction corps as a part of their regular duties. It could only have been accomplished in a separate air force by the creation of a distinct corps of technicians.

Further than this, all inspection work is carried on by the regular inspection service of the Navy; medical service is provided by the naval medical corps; recruiting, training and administration of the personnel is carried on by the Personnel Division of the Bureau of Navigation, which bureau also develops and supplies aircraft instruments and navigational equipment peculiar to the needs of naval aviation. Intelligence work in the form of accumulating data and information on world progress in aviation is done by the Office of Naval Intelligence, and communication work is conducted under the Office of Naval Communications.

Full use is made of the existing industrial facilities of navy yards and naval stations to meet the Navy's aviation requirements, and the personnel of the Bureau of Yards and Docks, having cognizance of all public works of the Navy, is fully able to cope with the requirements of our air stations on shore.

The divorcing of aviation from the regular naval establishment would necessitate the re-creation of agencies for performing all of the functions enumerated above. It would result in inevitable duplication and duplication is only another term for doubling expense.

I do not wish to be misunderstood as to my position. I am in no sense depreciating the value of cooperation. What I wish to point out is that cooperation should not assume the form ad-

vocated by those favoring a consolidated air service. There should always be full cooperation between the aircraft branches of the Army and Navy. Such cooperation is in force today, despite the general impression to the contrary.

Coordination and Cooperation

The National Advisory Committee for Aeronautics was established in 1915 and has two members from the War Department from the office in charge of military aeronautics and two members from the Navy Department from the office in charge of naval aeronautics. The reports of this committee clearly indicate the extent of cooperation between the War and Navy Departments and the Advisory Committee. Through subcommittees representatives of both departments are in intimate contact and are fully cognizant of the developments and investigations in hand by the committee for each department. During the war the Aircraft Board functioned for the purpose of supervising and directing the purchase, production and manufacture of aircraft, ordnance, accessories, etc.

Even before the war the two departments had come to an understanding as to the field of service. Since the discontinuance of the Aircraft Board, on March 19, 1919, coordination has been carried on, part of the time through the Joint Army and Navy Board on Aeronautics, and is now carried on by the Aeronautics Board which reports to the Joint Army and Navy Board.

The technical reports of the principal development work of the Army in aircraft and accessories, which is conducted at McCook Field, Dayton, Ohio, are regularly supplied to the Bureau of Aeronautics of the Navy, which also has an officer on duty at McCook Field.

The Bureau of Aeronautics keeps the office of the Chief of Air Service, U. S. Army, and McCook Field, supplied with copies of its technical orders and notes. This bureau also prepares special investigations and reports for the National Advisory Committee for Aeronautics, which publishes these data. Arrangements are now in existence for the interchange of contracts as soon as they are let by either the Army or the Navy for aircraft material, as well as reports of trial boards on the acceptance of airplanes. Also, where it may be of advantage to

one of the two departments, inspections are handled by the field force of the other department. By such coordination and interchange of information, duplication is largely avoided and such duplication as does exist is principally due to the lack of adequate facilities in either department to conduct the volume of work demanded.

True, competition has developed along certain lines, which may have led to something in the nature of duplication, but it is a healthy and beneficial competition which has resulted in important and rapid improvements in aircraft engines, accessories, etc., beyond what might otherwise have been accomplished.

These are some of the facts upon which I base my opinion that a consolidated air force would not realize the advantages claimed by its advocates, and some of the reasons why I firmly believe that such consolidation would be detrimental to national interests and would weaken national defense.

NAVAL INTELLIGENCE[1]

By Captain Luke McNamee, U. S. Navy

ALL INTELLIGENT human action is based on information. Whether we deal with our private business or with public affairs if our actions are not based on reliable information we are playing a game of blind man's buff. In private or public business every foolish investment that we make, every unwise action we take, is caused by ignorance or misinformation. The Congress under the Constitution is required to provide for the national defense. Unless appropriations are to be made in ignorance of what possible or probable strength could be brought against us they must have information of the strength, disposition and probable intentions of the other great powers of the world. The Office of Naval Intelligence is a government agency to supply that information. Information of the probable intentions of other powers helps to maintain peace.

We regard it as one of the duties of the Navy in time of peace to do everything in its power to preserve that peace and to foster good international relations. There is a peace strategy as well as a war strategy. The greatest victories are the victories of peace. The greatest battles are battles that have never been fought. The business of the Navy in peace is to prevent war. If we can see trouble coming, if we see preparation for war and see it in time, diplomacy may step in and take action to prevent it and incidentally the work of diplomacy will be made easier if some power contemplating aggressions sees that we are strong and ready. Mahan says that military strength gives moral ideas time to take root. The recent arms conference is a case in point. I cannot go into that question here but I think I violate no confidence when I say that the knowledge that there existed a menacing situation in the Pacific based on reliable information showed urgent necessity for diplomatic action, and that the exist-

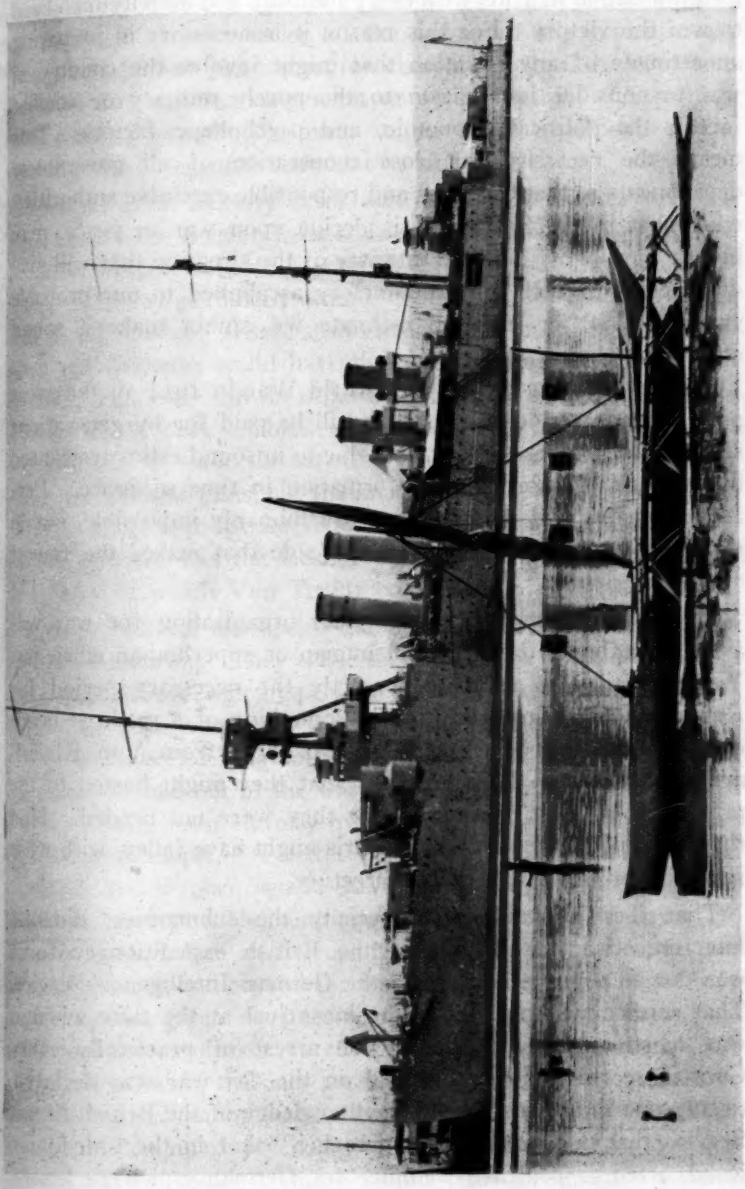
[1] Lecture delivered on board U. S. S. *Henderson*, March 9, 1923.

ing strength of our Navy made easier the cordial cooperation for a peaceful solution.

There is no greater economy that we can practice than to make use of the knowledge and experience of others. Countries that maintain large armies and navies, more or less on a war footing, are constantly developing new means of waging war. Common prudence requires that we keep abreast of the times and know what they are doing. The best and cheapest way that I know of keeping up to date is by supplementing our own investigations and experiments with the inventions and discoveries made abroad. In this way by taking advantage of the discoveries of others we save millions of dollars in experimentation and that by the expenditure of only a few thousands paid for information. There is nothing underhand about this. Foreign countries are missing nothing in the way of new developments in this country and exchange of information is largely a matter of reciprocity.

The functions of the Office of Naval Intelligence are frequently misunderstood. During the war we necessarily had thousands of agents whose business was to guard against spies and traitors. This was a war condition under which the just suffered with the unjust, for of course many ludicrous mistakes were made by amateur agents. But now in peace time all that work in the United States is handled by the Department of Justice. If we have information of activities against the government we hand it over to Justice. What men we employ occasionally in this country are solely for the purpose of naval administration. Our attachés abroad are staggering under a heavy load and are never able to catch up with all the demands we make on them for information, but with the limited means at their disposal they can only do the best they can with the tools they have. Information of value is not handed out on a silver platter and those who demand accurate up-to-date information about secret matters effecting foreign armaments should realize that we can't get anything valuable for nothing. Information like everything else is worth about what you pay for it—not in bribery or corruption but in the maintenance of expert men who are able to understand what they see and make reports that are of technical value.

The day has passed when armies and navies make war while the mass of people enjoy their normal life of peace. Modern war



U. S. S. "Milwaukee" in the South Sea Islands

means a nation in arms with every industry and activity mobilized to win the victory. For this reason it is necessary in preparing an estimate of any situation that might involve the country in war to consider in addition to the purely military or combat factor, the political, economic, and psychologic factors. This means the necessity for close cooperation of all government departments so that Congress and responsible executive authorities, who must in the final analysis decide upon war or peace, may have a thoroughly digested estimate of the situation that will give due weight to each of these factors as applied to our probable enemy. Without such an estimate we cannot make a sound strategical plan of campaign.

On the breaking out of the World War in 1914 all the great powers made serious errors that will be paid for by generations still to come. These errors were due to unsound estimates caused by the lack of coordinated information in time of peace. Perfect estimates and perfect plans are humanly impossible, but in war victory is apt to rest with the side that makes the fewest errors.

Take Germany for example. Her organization for war was assumed to be the last word in human or superhuman efficiency. Yet she failed to estimate correctly the necessary period for Russian mobilization, resulting in something of a panic at headquarters and the detachment of two corps from Von Kluck's army marching on Paris in order that they might hasten to the protection of East Prussia where they were not needed. Had they remained with Von Kluck, Paris might have fallen, with what further results we can only conjecture.

That the German fleet, especially the submarines, did not interfere with the passage of the British expeditionary force was due to a grave blunder in the German Intelligence Service. That service was put out of business just at the time when it was most critically needed. The arrest of practically every German secret agent in England on the day war was declared, twenty-one in all, was due to the knowledge of the British Secret Service that one Karl Gustav Ernst, a baker in the Caledonian Road, acted as central post office for German espionage letters. He was paid only a pound a month to drop letters in the box. The examination of this one box was all that was necessary to

locate every German spy in England. Von Tirpitz complains of this lack of information of the sailing of the expeditionary force, and he has just cause for complaint. It is hard to conceive of a clumsier arrangement or of any system of espionage that would leave the discovery of an agent to depend on the opening of a letter, or the search of a single post box.

Another great military error was the use of the heavy Skoda guns against the Belgian forts at Liege. Possessing this powerful surprise weapon capable of demolishing the strongest fortifications, Germany permitted France to learn a lesson from Liege that saved Verdun. There seems little doubt that with this equipment the Germans could have broken the French front without touching Belgium. On the other hand a better French intelligence system would have enabled the French to provide against this weapon. It is claimed that 100 French attachés reported the existence of these guns, but the inertia of peace-time governments prevented any appropriate action. Another example from which we might learn was the lack of coordination between the Army and Navy of which Von Tirpitz complains so bitterly.

From a political standpoint the German Foreign Office made a very poor showing. They chose the moment to declare war when the triple entente was in perfect understanding; when the best they could hope from Italy was neutrality; and when the violation of the neutrality of Belgium would destroy the last hope of keeping Great Britain out of the war. On the other hand, they forced Turkey's hand most cleverly by sending the Goeben and Breslau into Constantinople. A better instructed intelligence service in England and France would have hit upon this procedure as being at least possible, and might have led to instructions to Troubridge to follow these ships through the Dardanelles, destroy them at all cost, and control the Straits. Such a move might have saved Russia, given an inlet to arms, an outlet to wheat, and prevented the revolution. As it turned out, both the British and French acted as if the only possible thing the Germans could do was to reach Pola or escape through the Straits of Gibraltar. But in the realm of psychology the German failure is most apparent. What could be more stupid than Bethmann's allusion to the Belgian Treaty as "a scrap of paper"; or the sinking of the *Lusitania* after the warning published in the New York papers

which prevented a possible explanation that the sinking was unauthorized; of the "Spurlos Versenkt" message sent in a code that a child could decipher; or the Mexican-Japanese Message of Zimmerman, offering Texas and California to Mexico while we were still neutral and trying to keep out of war? It makes little difference in psychology what justification exists for any action; if it is calculated to produce an ugly effect on the popular mind, that effect is a factor that must be carefully weighed against any advantages that may be gained.

In the economic field the German estimate was fundamentally unsound since, so far as known at the time, success depended upon overwhelming victory on land in a short war. Surrounded by enemies, economic blockade was a certainty. The efficiency of the submarine as a weapon against commerce had yet to be demonstrated and with Great Britain's almost certain entry into the struggle a long war was inevitable. The heroic efforts and wonderful successes of her chemical laboratories in discovering substitutes for the necessities of war could hardly have been anticipated.

The foregoing is cited to show how the four great factors—military, political, economic, and psychologic—are so interlocked that no sound war plan can be devised without careful estimate of all the information bearing on each factor.

Military intelligence in time of war or combat intelligence has this important difference from intelligence covering the other three factors. Its value depends largely on its timely reception. The value of political, economic, or psychologic information is frequently permanent and enduring. But the facility of communication given by airplane, radio, and wire has so increased the possibilities of rapid strategic and tactical concentrations that combat information to be of use must anticipate the enemy's dispositions sufficiently to permit of counter measures.

The intelligence problem of the Navy in time of war differs widely from that of the Army. Armies operate usually in thickly settled communities surrounded by civilians and all the activities of commercial life. Thousands of spies more or less familiar with every phase of land warfare may watch every movement and draw more or less accurate conclusions. The mail, telegraph, telephone, and radio are all more or less available for purposes

of espionage because commerce and diplomacy demand their use even under the strictest censorship. Land campaigns require weeks and months for preparation and even strictly tactical movements may cover periods of weeks. This gives a certain time for information to be acquired and disseminated. Spies and traitors frequently drop information from airplanes behind the lines. In fact the checkmating of the aviator spy or traitor in our own ranks is the hardest problem of modern warfare. He departs in his single seater and none can say where he has been or what he has done in his long hours of absence behind enemy lines.

The navies, unlike armies, operate largely in the realm of the unknown. Ships come into port and sail again, usually at night. Their destination must always remain in doubt. Few civilians know the types of the vessels they see. Numbers, strength and armament are misstated or exaggerated. Spies, even though admitted to ships and dock yards, are as a rule incapable of benefiting by a view of masses of highly technical material. In fact few naval officers after such visits could give anything of much practical value to the enemy engineer engaged in evolving new designs. The Germans strove to overcome these difficulties by sending to their agents a list of the precise information which they desired. This questionnaire turned up repeatedly during the war and was always practically the same. They sought by getting reports from many sources on the few essential things to piece out the truth. This move was sometimes countered by the British Admiralty by allowing false information to be stolen. A curious example of the success of this counter-move was the belief of the Germans, when they came in to surrender at Rosyth, that the *Iron Duke* was Beatty's flagship.

In time of war if naval information will be hard for the enemy to secure, it will be equally hard for us. This points to the necessity for obtaining everything possible in advance of war. When war comes it will be too late. In addition, with an efficient intelligence service the country can in time of peace save millions of dollars in experimentation and costly mistakes by a knowledge of the results attained by friendly powers in the solution of similar problems.

For combat information preceding and during a naval action the commander-in-chief will be largely at the mercy of his in-

telligence service. He may know in a general way the enemy's strength in the theater of war and his probable intentions, but he will on the eve of action find the situation becoming hourly more confused by conflicting information—reports of enemy forces sighted by aircraft, by auxiliaries, by neutrals; false reports broadcast by the enemy, some of which will purport to come from his own ships. Amid all this confusion there must sit near the admiral an intelligence staff that can winnow the wheat from the chaff. Expert radio men may know the wave lengths, the time, the idiosyncrasies, the touch of the enemy's operators. This sounds impossible, yet it is the very thing that British operators did in the war. It was useless for the Germans to change call letters or exchange them between ships as long as the operators remained the same. They were spotted at once. The *Oldenberg* could not palm herself off as the *Derfflinger*. Enemy's codes must be known; and if not known, broken. Direction finders will give the key to the probable source of dispatches.

I am not speaking now of what is desirable theoretically, but of what was actually done in the World War, and we can be sure that all that is capable of vast improvement today. It may be that the one chief source of information, the radio, will in the next great war be entirely lost to us. Secret radio is well within the possibilities. The advantage of exclusive possession of such apparatus needs no comment.

But what will concern the admiral most will be the problem of how to gain knowledge of the enemy's tactical dispositions before sight contact. The great range of modern artillery precludes the possibility of much maneuvering after the main bodies are in sight. It will, therefore, be important to gain and deny information by establishing and maintaining supremacy of the air as early as possible. Fighting planes will drive off the enemy scouts, or planes equipped with special cameras will photograph and deliver to the flag a finished panorama of the fleet, with a detail that it would take hours to report.

In the absence of aircraft a knowledge of the enemy's radio may enable direction finders in the fleet to get an intersection on important vessels of the enemy main body that will at least give a clue to its location and course.

In the German fleet certain ships were detailed to handle the

traffic of groups. This facilitated business in the fleet, but made it easier for the British intelligence service, who by listening only to the traffic ship, could catch all the messages of the group. The grouping for traffic also indicated what ships were together.

A German officer, referring to the battle of the Dogger Bank, states that "Everything would have gone according to expectations if, as we now know, the British had not continuously caught the German wireless messages and almost entirely deciphered them." This officer accounts for the British knowledge of the German code by the discovery made after the war that Russian divers had picked up the German code books thrown overboard from the stranded cruiser *Magdeburg* in 1914, but the German codes were repeatedly broken during the war, stolen by agents, and fished up out of sunken submarines. In the case of Dogger Bank, the admiralty were able to send a despatch to Jellicoe, Beatty and the light cruiser forces, beginning as follows: "4 German battle cruisers, 6 light cruisers, 22 destroyers will put to sea this evening for reconnoitering expedition against the Dogger Bank. Return probably tomorrow evening," etc. The directions for a concentration against them followed.

This illustrates how promptly information must be disseminated to be of value. This information required instant action to get forces to the Dogger Bank area in time to intercept. Even though the plan for timely concentration of superior forces against the Germans was not entirely successful, nevertheless the incident illustrates the enormous advantage the British possessed in their intelligence service.

I think you are all more or less familiar with the methods used in the war for keeping track of the German submarines. Here radio, sinkings, reports of sighting, German orders and instructions, and radio direction finders each contributed its share to keep them pretty reliably plotted. Frequently their detailed orders were known by the British before the subs left port. How this was done must in some of the most interesting cases remain a secret. Agents in adjoining neutral ports were a great help, but the ramifications of espionage reached into the highest quarters. Had Germany been victorious there might have been some interesting house cleaning in Berlin; but, after the overthrow of a

government, traitors have a way of getting transformed into patriots.

Considering the vast problem of accumulating, classifying, evaluating, and disseminating intelligence affecting every country in the world in its four great aspects, you may be interested to know to what extent a solution is attempted by the Office of Naval Intelligence.

Our annual allotment is $150,000. Out of this we maintain abroad twenty-two officers, as attachés and assistants, in eleven different posts each of which we must maintain with clerk hire, rent and all expenses.

The Office of Naval Intelligence exists only for providing and operating the machinery whereby information is taken from every available source, digested into facts and probabilities, and distributed to those who can use the product to our country's advantage. It is my opinion that nowhere in the government or in private business is there such a large return for the expenditure of $150,000.

THE U. S. NAVAL RESERVE FORCE

WHY IT IS. WHAT IT IS. WHAT IT OUGHT TO BE

By Commander J. A. Schofield, U. S. N. R. F.

THERE was a time not so very long ago, when there was no great difference between the man-of-war and the merchantman except in gun power; when both alike depended on the winds of heaven to waft them across the broad bosom of the mysterious sea; when those who went down to the sea in ships bore the impress of the sea and the Navy boasted iron men and wooden ships; when it required only a letter of marque and a couple of guns to convert any merchantman into a more or less efficient man-of-war; the words "Train" as applied to the fleet and "Logistics" were yet unborn, as were also the words "Naval Militia" and "Naval Reserve." There was no need for them or what they represent.

But gradually and in the process of time a mighty change has taken place, until today we have merchant ships of special types scattered over the seven seas and not suitable for war purposes except in an auxiliary sense, and their crews not suitable for man-of-war's men except through special additional training, nor immediately available in time of need even if they had this training; we have fighting craft fit for nothing else than to fight, in commission and out of commission, those in commission manned below their war time complements with especially trained officers and men, and those out of commission, more or less immediately ready in case of emergency but manned not at all.

If war should come, we must have immediately available sufficient trained officers and men to bring the complements of our ships in commission up to fighting strength, to man the ships out of commission, to man the auxiliaries in and out of commission, and to perform such shore activities as training the additional officers and men who will be required as the war goes on, and to perform inspection and other technical duties. If we could main-

tain a peace time naval establishment sufficient to do all this, a naval reserve would not be necessary. But no great nation can afford to maintain such a peace time naval establishment; all great nations must perforce maintain reserves of officers and men especially trained and immediately available in case of sudden emergency, but who derive their means of sustenance from other lines of endeavor, who are producers rather than consumers so far as the public purse is concerned.

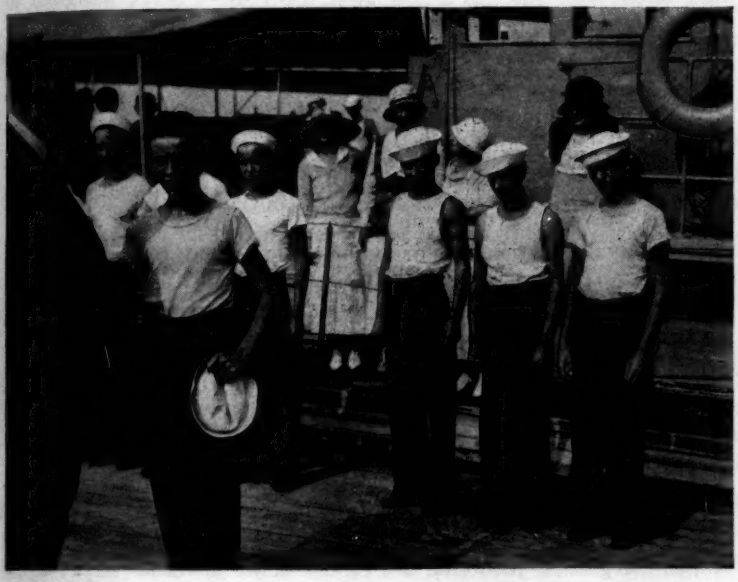
The British Empire maintains a naval reserve composed as follows: (a) The Royal Naval Reserve, composed of officers and men serving on merchant vessels, fishing vessels, etc.; (b) The Royal Fleet Reserve, composed of ex-enlisted men from the Royal Navy; (c) The Royal Naval Volunteer Reserve, composed of land-faring people who undergo drills and training for duty on board combatant vessels; (d) The Special Reserve of Engineer Officers, composed of ex-temporary Engineer Officers of the Royal Navy; (e) The Officers on Emergency List, composed of ex-officers of the Royal Navy; (f) The Royal Naval Auxiliary Sick Berth Reserve, established to provide a supply of hospital corpsmen in time of war; (g) The Royal Australian Naval Reserve, which is the active reserve of the Commonwealth of Australia; (h) The Royal Canadian Volunteer Reserve; (i) The South African Royal Naval Volunteer Reserve, and in addition there should be mentioned the Reserve of Retired Officers and Pensioners. All of these are required to undergo certain training both afloat and ashore, and are paid very nominal fees for maintenance of efficiency. The strength of the British Naval Reserve is approximately 2,200 officers in all grades from midshipman to commodore, and 44,000 men.

Likewise Japan maintains a naval reserve, consisting of approximately 1,800 officers and 30,000 men.

Our own Navy Department has enunciated the following policies in this regard:

> To create, organize, and train a naval reserve sufficient to provide the supplementary personnel necessary to mobilize the fleet and all its auxiliaries. To make the Naval Reserve Force secure in its status and organization as a part of the Navy and to guard its best interest. To cultivate a close association of officers of the active Navy and of the Naval Reserve. To emphasize, in the training of the reserves, the duties most likely to be assigned them afloat upon mobilization. To be generous in assigning officers to duty with the Naval Reserve and to educational institutions.

The need for a body of trained civilians ready to augment the Navy in time of war appears first to have been seriously realized by the state of Massachusetts, which passed an act in 1887, "To create a Naval Battalion to be attached to the Volunteer Militia." It is interesting to note this date in relation to the transition from the old to the new Navy. Thereafter naval militia organizations were established by legislative acts in various states, as part of the national guard of those states; until, at the outbreak of the Great



MAYOR KIEL OF ST. LOUIS COMMENDING SEAMAN EDW. V. BURKE, U. S. N. R. F., FOR HEROISM

War most of the Atlantic Seaboard, Gulf, Pacific Coast and Great Lakes states maintained naval militia organizations. These organizations were state controlled, but looked to the federal government for assistance in the way of floating equipment, arms, uniforms, etc.; and through this means the federal government eventually came to exercise a limited control of prescribing standards of fitness both for individuals and for organizations, which must be met in order to retain this assistance. Membership was entirely voluntary and no remuneration was received for maintenance of efficiency; enlistments of men and appointments of

officers were for a definite period of years, and, once enlisted, men could be punished for failure to attend drills, the same punishments being prescribed for petty offenses under the civil code. Several of the states built up organizations of considerable size and efficiency, and expended large sums providing armories, etc. At the outbreak of the Spanish American War they constituted the only readily available reserve on which the Navy could immediately draw and furnished 4,216 of the 10,373 additional men taken into the Navy for that war; these were assigned to duty on all classes of vessels, certain of the auxiliaries which were acquired and converted at that time being manned exclusively by naval militiamen. On January 1, 1899, nineteen states maintained naval militia organizations totalling 492 officers and 6,300 men. On June 30, 1916, twenty-one states, one territory and the District of Columbia, maintained naval militia organizations totalling 638 officers and 9,170 men.

The naval militia system which thus came into being, had certain objectionable features, principally lack of sufficient federal control; they were purely state forces and when inducted into federal service they had to be mustered in as individuals volunteering for this federal service. The following is quoted from the annual report of the Assistant Secretary of the Navy for the year 1898, following the Spanish American War:

> Our experience in the Spanish War has really been the only opportunity we have had with the system of an auxiliary naval force organized as a naval militia, and while such organizations responded with eagerness and showed the greatest patriotism and earnest desire to render service to the government, it was found that the existing system had elements of weakness, which, under severe stress and against a powerful enemy, would have caused great anxiety; that for the actual needs of warships and such auxiliaries as were required for deep sea work there was needed a reserve which could be promptly mobilized under the call of the President, and which would be so enrolled that such call could be at once sent out to the individuals making up such a reserve through the Department. Thus the attention of all has been turned to a national naval reserve ....., ..., ... To this end such a force must necessarily be maintained absolutely out of federal appropriations, and no other appropriation could be considered, as complications of this sort would lead to friction, which could only impair the efficiency of the force as well as tend to a divided authority.

The establishment of a naval reserve force exclusively under federal control was seriously considered from time to time after this, but no enabling legislation was secured till March 3, 1915,

when the flames of war were raging in Europe and were threatening to spread to this country. This act authorized a naval reserve of two classes, to be composed of men discharged from the Navy and assigned to the one or the other of these classes according to length of time intervening between service in the Navy and in the Naval Reserve. The first class received from $30 to $120 annually and was required to keep outfits of uniform clothing on hand; the second class received $12 annually and when called into active service was allowed an outfit of clothing not exceeding $30 in value. Provision was made whereby members of this Naval Reserve might be required to perform from one to two months' active service afloat each year on board vessels of the Navy. There was no obligation as to drills or other training between cruising periods. An inappreciable number of men joined, thereby obligating very little of the $130,000 appropriated for this purpose.

By the Act of August 29, 1916, the present Naval Reserve Force was brought into being; it provided for a body of officers and men in various classes, six in number, who, in joining, obligated themselves to serve in the Navy in time of war or during the existence of a national emergency. The Naval Militia was federalized under this act, and was known as the National Naval Volunteers, but later, by the Act of July 1, 1918, the National Naval Volunteers were transformed to Class 2 of the Naval Reserve Force thereby wiping out all distinction between the Naval Militia and the Naval Reserve Force.

The Acts of August 29, 1916 and July 1, 1918 and certain portions of subsequent appropriation bills, give us the Naval Reserve Force as it is today, composed as follows:

Class 1-A. Ex-officers of the regular Navy who have left the service under honorable conditions. Enrolled for four-year periods. Required to perform thirty-six armory drills per year or other equivalent duty, and to perform sixty days' active duty in periods of not less than fifteen days, during each enrollment. Receive two months' base pay of their grade per year, provided they perform the minimum drills and active duty required, plus certain additions for longevity; active duty pay and allowances while performing active duty; uniforms to the value of $50 during each enrollment. (Due to lack of funds which may be used under the law for continuing this class, no enrollments or re-enrollments are being made therein at the present, but those who are eligible may be enrolled in Class 2 or Class 6.)

Class 1-B. Ex-enlisted men of the regular Navy who have been honorably discharged after at least one complete enlistment. Enrolled for four-year periods. Required to perform thirty-six armory drills per year or other equivalent duty, and to perform sixty days' active duty in periods of not less than fifteen days, during each enrollment. Receive two months' base pay of their grade per year, provided they perform the minimum drills and active duty required, plus certain additions for longevity; active duty pay and allowances while performing active duty; uniforms to the value of $80 up to $100 during each enrollment. (Due to lack of funds which may be used under the law for continuing this class, no enrollments or re-enrollments are being made therein at the present, but those who are eligible may be enrolled in Class 2 or Class 6.)

Class 1-C. Enlisted men of the regular Navy compose this class, by transfer thereto after sixteen years' service, and they continue therein until placed on the retired list of enlisted men after thirty years' service in the Navy and the Naval Reserve. Subject to call to active duty in case of war or national emergency. Not required to drill or train in peace time. Receive one third their rate of pay at time of transfer plus all permanent additions thereto.

Class 1-D. Enlisted men of the regular Navy compose this class, by transfer thereto after twenty years' service, and they continue therein until placed on the retired list of enlisted men after thirty years' service in the Navy and the Naval Reserve. Subject to call to active duty in case of war or national emergency. Not required to drill or train in peace time. Receive one half their rate of pay at time of transfer plus all permanent additions thereto.

Class 2. Officers and men enrolled for four-year periods and available in case of war or national emergency for seagoing duty on combatant vessels. Made up of officers and men and ex-officers and men of the Naval Militia, ex-temporary officers of the Navy, officers and men with war experience in the Navy at sea, and recruits without previous sea experience taken into the lower grades since the war. Required to perform thirty-six armory drills per year or other equivalent duty, and to perform sixty days' active duty in periods of not less than fifteen days, during each enrollment. Receive two months' base pay of their grade per year provided they perform the minimum drills and active duty required, plus certain additions for longevity; active duty pay and allowances while performing active duty; uniforms to the value of $50 for officers and $80 to $100 for men, during each enrollment.

Class 3. Officers and men of the merchant marine actually engaged in the sea-faring profession, enrolled for four-year periods for duty in case of war or national emergency or auxiliaries. Not required to drill or train. Officers receive one months' base pay of their grade per year, and men two months' base pay of their grade per year.

Class 4. Officers and men enrolled for four-year periods and available in case of war or national emergency for the coast defense and for special

technicist duty on shore. (This class has been permitted to die out, those eligible now being carried in Class 6.)

Class 5. (This is Bureau of Navigation classification, the legal designation of this class is 6.) Composed of qualified aviation officers and men qualified for aviation ratings, enrolled for four-year periods and available for aviation duty in case of war or national emergency. Required to perform thirty-six drills per year or other equivalent duty, and to perform sixty days' active duty involving flying, in periods of not less than fifteen days, during each enrollment; there must be included in drills and active duty at least fifteen hours' flight per year. Receive two months' base pay of their grade per year, provided they perform the minimum drills and active duty required, plus certain additions for longevity; active duty pay and allowances while performing active duty; uniforms to the value of $50 for officers and $80 to $100 for men, during each enrollment.

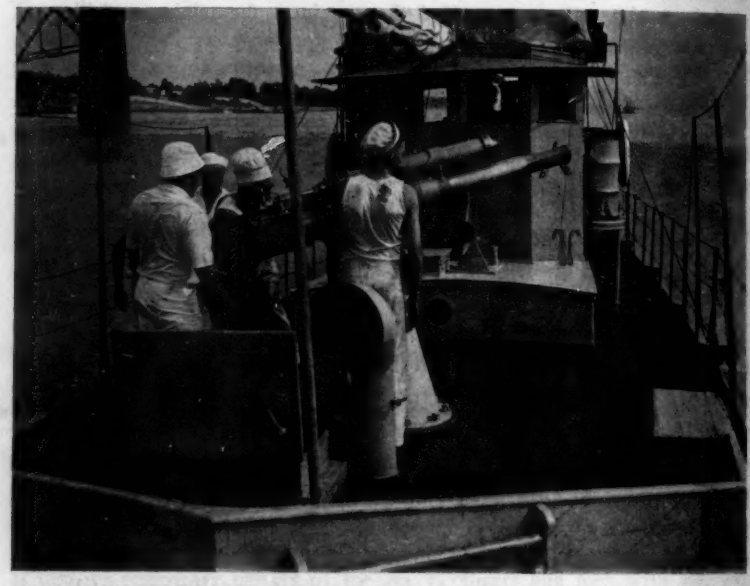
Class 6. (This is Bureau of Navigation classification, the legal designation of this class is 5.) The Volunteer Naval Reserve, made up of officers and men eligible for any of the preceding classes, who enroll for four years and are available for duty in case of war or national emergency. Not required to drill or train. Receive no retainer pay. May be given active duty if they desire it, in which case they receive active duty pay and allowances, plus the uniform allowance given the other classes.

No reservist may be enrolled or promoted in peace times beyond the rank of lieutenant commander. Officers are assigned running mates of the regular Navy for purposes of promotion, and go up with their running mates within the limits of certain percentages allowed in each grade, provided they pass the required professional and physical examinations. If a reservist fails to perform three months' active service in an enrollment he receives no retainer pay for the last year of his enrollment, and receives $12 per year retainer pay during his next enrollment until such time as he has completed the required three months. No retainer pay is received while performing active duty. Reservists are given provisional rank, grade or rate, until such time as they have demonstrated their fitness to hold the assignment given them, when they may be confirmed in such rank, grade or rate, provided they have had three months' active service; no reservist may be confirmed in any rank, grade or rate, until he has had a minimum of three months' active service. Retainer pay is given according to confirmed rank only, and not according to provisional rank; so no one may receive retainer pay until he has been confirmed in some grade.

Prior to the National Defense Act of June 3, 1916, for the Army, and the Act of August 29, 1916, for the Navy, members

of no organizations had been paid for attendance at drills; it had, however, been discussed and considered for several years, due in large measure to a change of conditions of training and administration permitting more federal control and supervision.

At the conclusion of the Great War there were 21,985 officers and 273,094 men on the rolls of the Naval Reserve Force. These were released from active duty and an attempt was made to form them into various drilling organizations, but, due to lack of facilities



THREE-INCH GUN ON U. S. S. C. "330"
MANNED BY MEMBERS OF THE RESERVE FORCE

such as armories, etc., and lack of funds for the purpose of securing these things, and also due to the fact that attendance at drills was not made a prerequisite for the payment of retainer pay until 1920, and also due to the fact that following their demobilization, most of these reservists were in a measure satiated with martial affairs; satisfactory results were not obtained. Then in efforts to remedy this situation certain additional enactments were made from year to year, but while these did help very considerably, they also led to varying interpretations as to their real meaning when taken in conjunction with laws already in existence.

Adverse decisions by the Comptroller and others detrimental to the Reserve, have also now and again been made.

In September 1921, the Department, finding it impossible to carry on the Naval Reserve then in existence under existing laws and with the amount appropriated for that purpose for the fiscal year 1922, disenrolled the entire Naval Reserve Force, with the exception of Class 1 and those of the other classes who voluntarily transferred to Class 6 to avoid disenrollment. A board of experienced officers was called to make a thorough study of the entire naval reserve situation and to make recommendations as to remedial measures. This board was composed of the following officers of the Navy: Rear Admirals Thomas Washington, T. P. Magruder, and J. L. Latimer; Captains W. R. Gherardi and John W. Timmons, and Lieutenant Commander R. R. M. Emmet, recorder; it was known as the "Washington Board." Meetings were held over a period of several weeks and a very complete report submitted, reference to which will again be made later on, recommending remedial legislation substantially in the form as is now pending before both houses of Congress, in H. R. 9634, known as the Britten Bill, and S. 1807.

In the meantime, pending the enactment of remedial legislation, it was desired to carry on the Reserve as a going organization as far as possible with those members who had remained in the Reserve by transfer to Class 6 and with such recruits as could be obtained. Several of the states reorganized their Naval Militia, and congressional assent having been secured, these functioned as naval militia organizations with dual membership—Naval Reserve and Naval Militia. This arrangement is still in existence in these states and has proved very satisfactory in many ways. Sufficient money was appropriated for the fiscal year 1923, largely through the efforts of Senator Newberry, to resume activities in a small way, sufficient to give fifteen days' training cruises to 1,500 officers and 5,000 men, and to transfer this number out of Class 6 back to Classes 2, 3 and 5, where they could receive retainer pay for six months of that year. The appropriation for the fiscal year 1924 permitted active duty for fifteen days and drills for 1,640 officers and 5,400 men. The appropriation for the fiscal year 1925 will permit giving the fifteen days' active training duty and drills to 1,255 officers and 6,000 men of Class 2, and 200 officers and 110 men of Class 5, and fifteen

days' cruises to 500 officers and 2,000 men of Class 6, and carrying ninety-one Class 3 officers in a retainer pay status.

Since July of 1922, the drilling and training of the Naval Reserve Force has, therefore, been steadily going ahead, in spite of these adverse conditions, and in spite of occasional new and adverse interpretations of existing laws, until now we have drilling organizations at the places shown below, with enrolled strength at each as indicated:

Place	No. Officers	No. Men	Place	No. Officers	No. Men
Boston, Mass.	47	299	Allentown, Pa.	10	70
Worcester, Mass.	12	54	Pittsburgh, Pa.	23	102
Springfield, Mass.	6	34	Baltimore, Md.	83	390
New Bedford, Mass.	7	38	Washington, D. C.	98	235
Lynn, Mass.	10	89	Richmond, Va.	20	104
Fall River, Mass.	9	59	Newport News, Va.	12	53
Portland, Me.	9	63	Norfolk, Va.	64	67
Providence, R. I.	9	46	Charleston, S. C.	4	68
Newport, R. I.	3	36	Georgetown, S. C.	3	45
New York City, 97th St.	34	364	Greenwood, S .C.	7	51
New York City, 23rd St.	34	184	Columbia, S. C.	4	81
Ft. Hamilton Air Sta.	21	40	Atlanta, Ga.	29	196
Brooklyn, N. Y.	41	413	Birmingham, Ala.	7	22
Tompkinsville, N. Y.	5	64	New Orleans, La.	27	68
Whitestone Lndg., N. Y.	6	57	Galveston, Tex.	3	35
Ossining, N. Y.	3	59	Dallas, Tex.	10	50
Dunkirk, N. Y.	1	62	Chicago, Ill.	240	747
Watertown, N. Y.	6	58	Waukegan, Ill.	7	106
Niagara Falls, N. Y.	5	54	Highland Park, Ill.	1	20
Buffalo, N. Y.	9	94	Peoria, Ill.	3	46
Oswego, N. Y.	4	64	Burlington, Iowa	3	129
Rochester, N. Y.	13	156	Cincinnati, Ohio	7	36
New Rochelle, N. Y.	3	43	Cleveland, Ohio	41	209
Bridgeport, Conn.	5	96	Columbus, Ohio	6	136
New Haven, Conn.	13	64	Toledo, Ohio	36	182
Hartford, Conn.	5	47	Crosby, Minn.	1	33
New Brunswick, N. J.	2	46	St. Paul, Minn.	11	108
Newark, N. J.	20	141	Albert Lea, Minn.	3	42
Keyport, N. J.	1	20	Bemidji, Minn.	1	37
Jersey City, N. J.	15	95	Minneapolis, Minn.	29	392
Perth Amboy, N. J.	11	173	Duluth, Minn.	22	226
Camden, N. J.	13	196	Virginia, Minn.	3	55
Philadelphia, Pa.	77	340	Grand Rapids, Mich.	7	99
Erie, Pa.	5	54	Detroit, Mich.	109	329

Place	No. Officers	No. Men	Place	No. Officers	No. Men
Muskegan, Mich.	2	18	Brawley, Cal.	15	68
Mt. Clemens, Mich.	2	30	San Diego, Cal.	17	163
Hancock, Mich.	3	114	San Francisco, Cal.	168	288
Saginaw, Mich.	2	68	Fresno, Cal.	6	46
Benton Harbor, Mich.	9	100	Vallejo, Cal.	18	14
Michigan City, Ind.	4	86	Santa Cruz, Cal.	2	87
Indianapolis, Ind.	14	306	Palo Alto, Cal.	3	98
Milwaukee, Wis.	46	437	San Jose, Cal.	5	25
Green Bay, Wis.	4	133	Watsonville, Cal.	1	54
Racine, Wis.	1	37	Oakland, Cal.	45	72
St. Louis, Mo.	58	407	Santa Rosa, Cal.	7	25
Kansas City, Mo.	20	273	Portland, Ore.	42	135
Omaha, Neb.	9	55	Tacoma, Wash.	18	166
Lincoln, Neb.	2	82	Seattle, Wash.	117	379
Los Angeles, Cal.	12	317	Aberdeen, Wash.	10	147
Pasadena, Cal.	8	83	Bremerton, Wash.	8	62
San Pedro, Cal.	17	57	Bellingham, Wash.	5	26
Santa Monica, Cal.	4	90	Honolulu, T. H.	13	127
Santa Ana, Cal.	7	102	Not attached to any		
Santa Barbara, Cal.	7	88	drilling organization	1823	2690

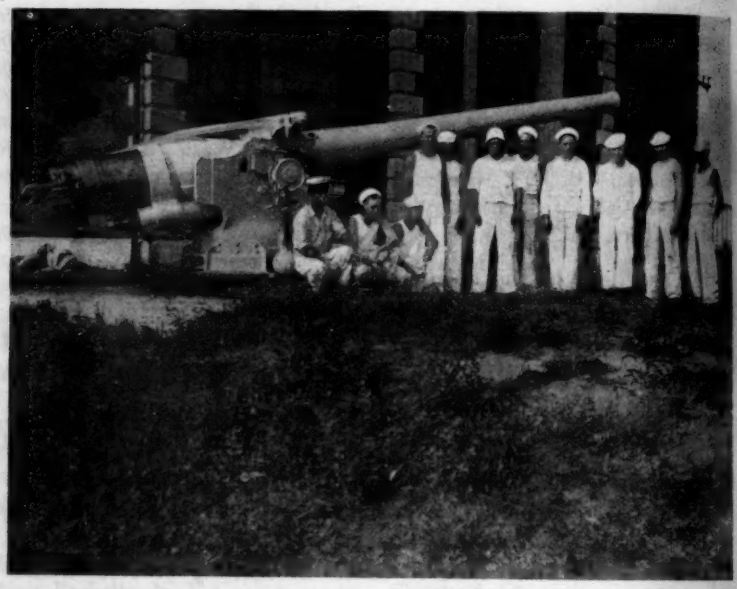
Drills are held in the evenings, one or more nights per week, generally from 7:30 to 9:30; they consist of about fifteen minutes of setting up exercises, followed by such assemblage drills as infantry, etc., loading drills, etc., with special instruction in seamanship, signals, engineering subjects and radio, and with officers' classes in navigation and ordnance and regulations; boat drills, and outdoor target practice are held at the convenience of those participating; week-end cruises on the vessels assigned to the various organizations, of from one to two days' duration, are carried out from time to time. Recruiting officers, hydrographic officers, inspection officers, etc., of the regular Navy doing duty near these organizations are assigned additional duty as inspector-instructors of these organizations.

The annual period of fifteen days' active duty for training is generally made on board the vessels assigned the various naval districts for the special purpose of training the Naval Reserve Force, the vessels cruising up and down the coasts or about the lakes, or occasionally to such foreign ports as Havana or Bermuda, officered and manned entirely by members of the Naval Reserve Force. The following vessels are assigned to this duty,

and are stationed at various places maintaining naval reserve organizations; they are kept up, under the direction of the district commandants, entirely by reservists:

Subchasers, to the number of 16
Eagle Boats, to the number of 22

U. S. S. *Fox*	U. S. S. *Illinois*	U. S. S. *Wilmington*
Wheeling	*Dubuque*	*Paducah*
Briarcliff	*Sturgeon Bay*	*Cheyenne*
Commodore	*Essex*	*Hawk*
Wilmette	*Wolverine*	*Yantic*
Newton	*Topeka*	



FIVE-INCH GUN AT THE U. S. N. R. F. ARMORY, ST. LOUIS, MO., 1923

Reservists are permitted to cruise on vessels of the fleet when their employment is such as to permit their getting in their fifteen days on board and as they can be accommodated on the individual ships. Special arrangements have been made for cruising those on the east coast on vessels of the scouting fleet for the summer of 1924, and on the west coast, in the battle fleet.

Aviation training is given to qualified aviators at the regular aviation stations and on ship board. Three naval reserve aviation training stations have been established for the purpose of

training new blood, officer material, to become aviation officers in the Reserve. These stations are located at Squantum, Mass.; Ft. Hamilton, N. Y., and Great Lakes, Ill. Young men of officer caliber are enrolled as seamen second class in Class 6 of the Naval Reserve Force, the recruiting being done mostly among college students; those selected are required to put in forty-five days' active duty at the reserve aviation station, where they are given a course of primary instruction, involving ten hours' dual flight with instructor and thirty hours' solo flight in training planes; the ground work is carried on during drill periods mostly at other times than during the forty-five days' active duty for training. The solo flying before completion of the course includes stunting, formation flying, scouting, night flights, etc. After

CUTTER RACE BETWEEN NAVAL RESERVE CREWS

satisfactory completion of this course the student is given forty-five days at a regular aviation station for advanced training in naval aviation; after which he is eligible for commission as ensign, Class 5. After this the requirements for maintenance of efficiency are the same as for other Class 5 officers.

The foregoing is briefly a sketch of the conception and birth of the Naval Reserve Force, and its development to date. It has now reached a stage where consideration must be given to its further development and training. Does it, as it exists today, satisfy the needs of the Navy? If continued in its present methods of training and development, will it eventually satisfy the needs of the Navy, and if so, how soon? What is its loyalty and temper? Or is a change in method of training and development required, and if so, how drastic a change?

These questions can not be answered until the ends sought are known. A determination of the ends sought will require a statement of general policies; such a statement was formulated by the "Washington Board" previously referred to, and is quoted as follows:

The board herewith states the policies which in its opinion should govern the creation and operation of a Naval Reserve:

1. *Components of the Navy of the United States.* The naval policy of the government of the United States should provide for the organization of our naval personnel into one harmonious, well-balanced, and effective Navy—the Navy of the United States—consisting of the regular Navy and the Naval Reserve.

2. *Mission of the Navy.* The Mission of the Navy may be stated as follows:

(a) *The Mission of the Regular Navy.* (1) To provide an adequately organized, well-balanced and efficient naval force, which will be available for emergencies and which will serve as a model for the organization, the discipline and training of the Naval Reserve.

(2) To provide in time of peace crews for the vessels of the Navy in commission required by the policy of the government.

(3) To man such naval stations as are requisite and necessary for the fleet.

(4) To provide the necessary personnel for the development and training of the Naval Reserve.

(5) The regular Navy is the first component of the Navy of the United States in peace and in war.

(b) *The Mission of the Naval Reserve.* (1) To provide, train and organize an effective force which, together with the regular Navy, will be sufficient to man and operate the fleet, aviation units and merchant marine.

(2) The regular Navy may be employed in all emergencies, but the Naval Reserve should be employed only in event of a national emergency proclaimed by the President.

(3) The Naval Reserve in the second component of the Navy of the United States.

3. *Development of Components*—(1) A clear understanding of the missions of these components and a spirit of mutual support and cooperation between them are essential to the development of an efficient Navy. A well-defined mission for each component must be definitely established. Both components are interdependent and must fulfill their respective missions in harmony.

(2) The Naval Reserve is an integral part of the Navy. Upon declaration of war naval reservists must take their place in the regular Navy with as little disturbance in the assignment of the regular officers and men as practicable. Therefore, naval reservists should know as far as is practicable the duty to which they will be assigned upon mobilization and their training should be directed to that end.

(3) All plans for the mobilization of the Naval Reserve should be incorporated in the war plans of the Navy.

4. *Coordination of Duties, Relating to the Naval Reserve, of the Offices and Bureaus of the Navy Department*—(1) The existence and maintenance of an organized Naval Reserve affects all the offices and bureaus of the Navy Department.

(2) All the functions of organization and administration necessary to the efficient operation of the regular Navy are necessary also to the efficient operation of the Naval Reserve.

(3) The development of the Naval Reserve depends primarily on the aid of the personnel and the use of the material of the regular Navy that can be assigned to that task.

(4) The Navy Department should determine the classes and numbers that form the Reserve; discover and develop sources of personnel and supply; decide on the organization and the assignment of quotas to districts; prescribe the general principles for administering, training and mobilizing the Reserve; make available the fleet or portions of the fleet for the annual active duty training of fleet reservists; determine the proportion of officers and men of the regular Navy to be employed regularly with the Reserve; determine the amount and character of the material of the regular Navy necessary to the development of the Reserve. In short, the Navy Department should have the responsibility of organization and regulation of the Naval Reserve.

(5) The foregoing important and varied duties cannot all be performed by any one bureau of the Navy Department. They must be distributed among all the bureaus. It is, therefore, recommended that the Office of Naval Operations be made responsible for the carrying out of approved naval reserve policies and coordinating the resultant duties imposed by such approved policies.

(6) The Bureau of Navigation should remain charged with the duties pertaining to the personnel of the Naval Reserve just as it is with the personnel of the regular Navy.

5. *Organization of the Naval Reserve*—(1) The organization and administration of the Naval Reserve should be carried out by the various offices and bureaus of the Navy Department exactly as the regular Navy is organized and administered in so far as is practicable.

(2) The Naval Reserve should be organized into three classes, to be called the Fleet Reserve, the Merchant Marine Reserve, and the Volunteer Reserve.

(3) The Fleet Reserve should be composed of officers and men capable of performing duty in combatant units of the fleet.

The obvious and best source of personnel for the Fleet Reserve is the large body of officers and men who during the late war saw active service in the Navy. As a result of such active service these men have absorbed those special qualities of loyalty, self respect, cheerfulness, enthusiasm, initiative, resourcefulness, aggressiveness, and tenacity that are necessary to the complete development of military and naval character and which,

together with the professional experience gained, eminently fit them for service in the Fleet Reserve.

As the years pass their efficiency will progressively decline. They must be replaced, barring the national misfortune of another first class war, by men of limited or no previous training in the regular Navy. It, therefore, becomes a matter of vital importance for the Navy Department to discover and develop the best possible sources of recruiting both the officers and enlisted personnel of the Fleet Reserve.

The Fleet Reserve of the future must necessarily include many men of limited or no previous naval service. It is important that the interest of the youth of the country in the Naval Reserve be aroused and facilities be created so that young men who are interested may receive instruction in the elements of the naval profession. The Navy Department should, therefore, in selected colleges and schools throughout the country, provide facilities for the elementary naval instruction of young men who may desire to join the Fleet Reserve in the future.

All enlistment contracts of men enlisting in the Navy in future should provide for four years' service in the Fleet Reserve in addition to the four years' service now specified in the regular Navy. Men so enlisted should be under no obligation to perform drill or training during their first four years in the Fleet Reserve.

(4) The personnel of the Fleet Reserve should be organized into divisions, battalions and brigades, with the division as the unit of organization.

(5) The Merchant Marine Reserve should be composed of officers and men in the Merchant Marine or those who are qualified to do duty on vessels of the Merchant Marine.

The Merchant Marine as it develops will attract in increasing numbers boys of energy and intelligence. Steamship lines or associations of lines may and probably will establish schoolships for the training of cadets. The best of these will be the deck officers and engineers of the future. States have established and will establish similar schoolships. The Navy Department should cooperate with these to the extent of furnishing personnel and material under suitable agreements to the end that all cadets in schoolships may receive elementary naval instruction which will increase their value both to their employers and to the country.

(6) The Volunteer Reserve should be composed of men who in time of peace serve without pay and are under no obligation as to training. Included in these are those who have already demonstrated their value to the Navy as well as those who by the practice of their ordinary occupations in time of peace fit themselves for service in the Navy in time of war. The numbers of the Volunteer Reserve should be based on the probable immediate expansion of the shore activities of the naval establishment in time of war.

(7) Transfers to and from the three classes of the Naval Reserve should be made in accordance with such regulations as the Secretary of the Navy may prescribe.

(8) Appointments and promotions of officers and enlistments and changes

in ratings of enlisted men of the Naval Reserve should be made in accordance with regulations prescribed by the Secretary of the Navy.

(9) In time of peace no officer or enlisted man of the Naval Reserve may be discharged except upon his own request or for just and sufficient reason in the discretion of the Secretary of the Navy.

In time of war officers and enlisted men of the Naval Reserve should be subject to separation from the Reserve in the same manner that is prescribed by law and regulation for separation of officers and men from the regular Navy.

(10) The officers of the Naval Reserve should have rank not greater than that of lieutenant commander, with the exception of a small percentage of higher ranks, not above that of captain, needed for the purpose of organization, administration and training.

Officers of the Fleet Reserve should be honorably discharged or transferred to the Volunteer Reserve when they reach the following ages in grade: lieutenant commander and below, fifty years; commander, fifty-five years; captain, sixty years.

Officers of the Merchant Marine Reserve and the Volunteer Reserve should be placed on an honorary retired list without pay or emoluments upon reaching sixty-four years of age.

The provisions of this paragraph should not apply to any officer now in the Naval Reserve during the period covered by his current enrollment except that all officers should be retired at sixty-four.

(11) Members of the Fleet Reserve should be required to perform such active training duty as may be prescribed by the Secretary of the Navy, but not to exceed fifteen days annually. However, reservists may, upon their own application approved by the Secretary of the Navy, be given additional active training duty with or without pay.

The annual active training duty of the Fleet Reserve should be, when practicable, carried out on board seagoing vessels of the Navy, including battleships, cruisers and destroyers; plans for such training should be formulated sufficiently in advance in order that the commandants of naval districts, commanders of naval forces, and reservists may plan for the training.

(12) Line officers of the Fleet Naval Reserve should be appointed for deck duties, engineering duties, or aviation duties in accordance with their qualifications.

6. *The Administration of the Naval Reserve*—(1) The administration of the Naval Reserve should conform, as far as practicable, to that prescribed for the regular Navy.

(2) Commandants of naval districts should be charged with the organization, administration and training of all units of the Naval Reserve within their districts in accordance with instructions laid down by the Secretary of the Navy.

(3) Commanders of naval forces of the regular Navy to which fleet reservists are assigned for their annual active training duty should be responsible for such training as prescribed under their command, and

further, should realize such duties are an important part of the Navy's mission to prepare for war.

(4) Commissioned and enlisted personnel of the regular Navy should be detailed to each naval district by the Navy Department for duty in connection with the Naval Reserve in that district.

When the regular Navy personnel assigned to a naval district is inadequate, the commandant of the district should request the Chief of the Bureau of Navigation to place on active duty such capable officers and enlisted men of the Naval Reserve who have consented to accept such active duty.

(5) Because of the limited time that Reserve officers not on active duty can be expected to devote to the Navy, the successful development of the Naval Reserve is largely dependent upon the efforts of the officers of the regular Navy detailed to naval districts for duty with the Naval Reserve. Entire cooperation in the carrying out of approved policies and training plans must exist between such officers and the officers of the naval reserve organizations. In organizing the Naval Reserve within the naval districts many of the duties of administration and training should devolve upon officers of the regular Navy assigned thereto.

(6) Commandants of naval districts should indoctrinate all naval reservists within their districts with their mission as members of the Naval Reserve, which may be stated as follows:

(a) The mission of the naval reservist is to subject himself to training in time of peace so as to be fitted to perform the duties of his rank in the Navy in time of war.

(b) To fulfill this mission he should (1) Diligently perform such training as may be prescribed by the Secretary of the Navy.

(2) Keep the commandant of the naval district informed of his address: this, in order that he may be included in the plan of the Navy for mobilization in time of war or national emergency. (This necessitates prompt reporting of any change of residence from one naval district to another to insure the transfer of service records.)

(3) Respond immediately to a proclamation of the President ordering mobilization of the Naval Reserve.

(7) Each naval district should be assigned by the Navy Department a definite percentage of the entire Naval Reserve as its quota, to recruit, organize and administer, in accordance with the following special principles:

(a) Fleet Reserve should be assigned to naval districts on a basis of population of seacoast towns and cities of each district. Great Lakes is to be considered seacoast.

(b) Merchant Marine Reserve should be assigned on a basis of the number of American owned steamships operating from seaports of each district. Ultimately, the basis should be ships designated by the Navy Department to be taken over by the Navy in time of war.

(c) Volunteer Reserve should be assigned on the same basis in general, as the Fleet Reserve.

7. *Mobilization of the Naval Reserve*—(1) Under instructions of the Navy Department, commandants of naval districts should prepare the plans

for the mobilization of the Naval Reserve in their districts. These plans, when approved by the Navy Department, should be incorporated in and form a part of the war plans of the Navy. There should be maintained at all times by the commandant of each naval district complete orders, except as to date, for the mobilization of the naval reservists in that district in accordance with approved mobilization plans.

(2) In the event of a national emergency proclaimed by the President, the President may direct the mobilization of the Naval Reserve in whole or in part, and may thereafter retain all or any part thereof in active service for such period as he may deem the conditions demand.

The foregoing general statement of policies may be said to constitute the ends being sought in legislation which must be had, and in the administration and training of the Naval Reserve; but to carry through these policies and meet these ends, new legislation must be had.

As stated, such legislation is now pending, quite similar bills having been reported out by both the Senate and the House Naval Affairs Committees, to their respective branches of Congress, recommending enactment into law, which enactment seems probable during the second session of the present Congress.

The principal objectionable features in existing laws necessary to change in order to accomplish that which is desired and intended, are as follows: Past service being a prerequisite to entitle a member to payment for attendance at drills, it is impossible to attract and utilize the very ones that it is imperative to have—young men. The pay in the higher grades for drill attendance does not compare favorably with the National Guard, and appears to be unduly high. Reservists performing volunteer training afloat, such as week-end cruises, are obliged to subsist themselves. Reservists injured or killed while performing active duty for training are not entitled to any relief from the Government on that account. Reservists who are civil service employees of the Government are not entitled to "Military Leave," for the purpose of performing their annual periods of active duty for training, as are national guardsmen and members of all other military organizations. Due to their multiplicity and varying provisions, existing laws are subject to varying interpretations.

Pending legislation, in the form of the "Britten Bill," is designed to accomplish the following: It takes away no privileges now enjoyed by any classes of the Naval Reserve, except it provides that instead of retainer pay there shall be pay for service;

this will result in somewhat less pay for officers in the higher grades. It establishes a Marine Corps Reserve absolutely on a parity with the Naval Reserve. It repeals all old laws which have been so difficult of interpretation. It establishes in the Naval Reserve the same grades, ranks and ratings as exist in the regular Navy. Officers are commissioned at the pleasure of the President, as are officers of the regular Navy, and enlistments of men are established for the same period as enlistments in the regular Navy. It provides that no officer or man shall be discharged except for full and sufficient cause. Officers and men are placed under the same laws in time of war or national emergency as are officers and men of the regular Navy. It permits commissioned grades up to commodore. It authorizes the appointment of a certain number of midshipmen to the Naval Academy from the Naval Reserve. It provides for promotion in time of war up to the grade of lieutenant commander with running mates of the line, and by selection for ranks above that of lieutenant commander. It provides for pay for drills, training and active duty based on the pay allowed the National Guard. It does away with confirmation in grade and provides that drill, training or active duty pay shall begin upon appointment or enlistment. It provides for a liberal uniform gratuity. It provides for properly caring for reservists injured in line of duty under the civil service provisions and the United States Employees Compensation Commission. It provides for an honorary retired list without pay upon reaching the age of sixty-four. It provides that men enlisting in the Naval Reserve within four months after their discharge from the regular Navy lose none of the benefits of continuous service. It safeguards the interests of enlisted men of the regular Navy who have been transferred to the Fleet Reserve after sixteen and twenty years' service, and provides the same privileges for men at present in the Navy. It provides subsistence for week-end cruises. In addition to the Fleet Reserve, it establishes a Merchant Marine Naval Reserve and a Volunteer Naval Reserve. It gives reservists who are employees of the United States the same leave of absence for training duty that is now granted the National Guard. It provides for the continuance of the Naval Militia of the various states as a part of the Naval Reserve Force.

THE NAVAL OFFICER IN DIPLOMACY[1]

By the Late Rear Admiral H. S. Knapp, U. S. Navy

THANKS to Kipling the characterization of the seaman as "The Handy Man" has become permanent in literature. Whether or not Kipling intended to restrict the appellation to men below decks, I claim that it applies equally to men who hold commissions, in which I am sure that your president will agree. As his successor in the European command, I take pleasure in saying now, as I always do take pleasure when opportunity occurs to say it in good taste, that no task arose in the trying days of demobilization that was beyond the capacity of naval officers to perform, and to perform well, however far removed from an officer's experience and usual activities. Some of these tasks were inheritances and some arose as time went on. It is a matter of great service pride to me to recall how naval officers all over the southern and western parts of Europe did things that really pertained to civil administration; and, as I have said, did them well—in some cases with distinguished ability.

What has just been said may appear to be rather wide of the subject; but that would be a mistaken notion. There is something in the training and experience of naval officers that makes for flexibility of mind and the application of hard common sense to the task in hand, which it was the intention to illustrate by reference to personal observation during my last months of duty before retirement. When an unusual task arises these qualities are immensely valuable. My belief in their existence among naval officers was no new thing but it was greatly strengthened during my last eighteen months of active service.

Now diplomacy is not ordinarily the mission of the naval officer, but if it comes in an officer's way to engage in diplomacy, why should we doubt that his flexibility of mind and common sense, combined with his experience, will enable him to do it

[1] A lecture delivered to the 1923 War College class.

successfully? John Bassett Moore, in his *Principles of American Diplomacy,* speaking of American statesmen at the time of the French Revolution, says that they "were not mere doctrinalres. Their aims were practical." It is generally true of naval officers that they are not doctrinaires and that they have practical aims. Diplomacy is statemanship applied to foreign relations. If practicality be a good thing in the equipment of a statesman or diplomat, the practical qualifications of naval officers to which I have referred should be a good foundation for diplomatic work in case of necessity.

It can scarcely be claimed that the life experience of the naval officer is a broadening one in the way of general culture in literary and intellectual pursuits. But it is broadening in the practical matter of international affairs and a knowledge of foreign peoples. As a class naval officers, and especially senior naval officers, are as widely traveled as, and have more contact with foreign officials than, any other class of our citizens; and a somewhat discriminating knowledge of relations with foreign nations is a necessity for the officer who has to justify his reason for existence. Can it be believed that the average experienced senior officer—and only to such would the opportunity be apt to come—is any less fitted for diplomatic action than some citizen (in many instances chosen largely because his fortune is sufficient to bear the expense of representing the government abroad) whose previous experience in diplomatic life has been no whit greater than the officer's own? It has not been so in the past; it is not so at this moment and we may confidently assert that it never will be so. While the exercise of diplomatic functions will be a rare experience for naval officers, we, who have an abiding faith in our profession, shall confidently expect that the work will be well done by them if occasion arises.

It will be of interest to note some of the instances in which American naval officers have acted in a diplomatic capacity. You will recall that the United States was the first nation to put an end to the exactions of the Barbary pirates. Operations went on for about fifteen years. In 1801 the Pasha of Tripoli, not content with the $30,000 tribute—blackmail—then being paid for immunity, cut down the flagstaff of the American consulate, and, in addition, held Americans for ransom. With the consequent

naval operations we are not especially concerned here. A treaty was negotiated with him in 1805 by which the prisoners held for ransom were released, tribute thereafter was waived and respect for American commerce was agreed to for the future, but this did not clear up the situation, for the Algerine pirates continued their depredations. Commodore Decatur brought the Dey of Algiers to terms and, in 1815, was co-signer with William Shaler of a treaty which insured, in the words of Willis Fletcher Johnson (*America's Foreign Relations*, Vol. I), "the abolition of the hateful and humiliating tribute which we had regularly paid down to that time." John Basset Moore (*op. cit.*) says of this: "Decatur . . . compelled the Dey on June 30th to agree to a treaty by which it was declared that no tribute, under any name or form whatever, should again be required from the United States. No other nation had ever obtained such terms." The treaty was renewed in the following year, one of the signers being Commodore Isaac Chauncey in his capacity as commander-in-chief of the naval forces of the United States in the Mediterranean.

At the beginning of the nineteenth century, in 1826, Captain ap Catesby Jones of the Navy negotiated a treaty with the Hawaiian Government, on his own initiative and without special instructions. It was an excellent treaty, but the Senate was not as wise as the naval officer and failed to ratify it. Thus the distinction and advantage of being the first nation to enter into treaty relations with Hawaii passed from the United States. Ten years later, in 1836, Great Britain made and ratified a treaty with Hawaii, followed three years later still by France. Both of these treaties, like that of ap Catesby Jones, were negotiated by naval officers.

In 1839 Commodore Wilkes, during his famous expedition, entered into an agreement with Samoan chiefs by which the interests of the natives and the whalers and traders visiting the islands from time to time were provided for. He appointed a consul to represent the United States and took measures to insure amicable relations in the future between the islands and the United States. (*Encyc. Americana*) No regular treaty seems, however, to have made until 1878. Moore says (*op. cit.*) that in 1782 "the great chief of the bay of Pago Pago, in the island

American Destroyer at Venice

of Tutuila, desirous of obtaining the protection of the United States, granted to the government the exclusive privilege of establishing a naval station in that harbor." From another source I have learned that it was Commander Meade of the Navy who obtained this grant (*Cath. Encyc.*), which was the basis of our claim to the islands east of 170° East longitude, in the tripartite treaty with Great Britain and Germany later on.

Our first treaties with an Asiatic power can hardly be claimed to be to the credit of the Navy, although the stamp of the sea was on their negotiator, Edmund Roberts, a sea captain of Portsmouth, N. H., and he was rated as "captain's clerk" on board the naval vessel that took him out, so that we may perhaps claim him as a naval officer "once removed." He certainly did not go in great state, for we read (Moore, *op. cit.*) that "If we were to judge by the provision made for his comfort and remuneration, we should infer that little importance was attached to his mission. His pay was barely sufficient to defray the cost of an insurance on his life for the benefit of his numerous children; and for three months he was obliged to lie on the sea-washed gun-deck with the crew, all the available space in the cabin being occupied by a *chargé d'affaires* to Buenos Ayres whose name is now forgotten." Roberts was only partially successful, but he did bring back treaties with Siam and Muscat.

We now come to an incident of great interest in connection with our subject. At the time of the "Opium War" between Great Britain and China the United States kept a squadron in the Far East for observation and the protection of American interests. It was under the command of Commodore Kearny, who obtained a heavy indemnity for illegal acts against the persons and property of Americans; but, far more important, he achieved a notable diplomatic coup at the end of the war. Quoting Johnson (*op. cit.*):

> Learning that in the peace treaty new tariff and trade regulations were to be made between China and Great Britain, he resolutely demanded that American citizens should be included, to enjoy the same advantages; in brief, that the "most favored nation" principle should be established in their behalf. The governor of Canton agreed that this should be done, testifying that American merchants in China had not been guilty of smuggling or other illicit practices but had confined themselves to honorable trade. On receiving this assurance Kearny would have taken his departure, but the

American Destroyer at Venice

American consul urged him to stay, as the presence of his vessels would have a salutary effect upon the Chinese commissioners who were coming thither to make the treaty. Kearny accordingly remained, and secured from the commissioners the formal and explicit assurance that whatever trade concessions were made to Great Britain should be fully and equally extended also to the United States. This was done, and as a result an "open door" was first secured in China, for all nations on equal terms; a result which, according to one of the British commissioners who negotiated the treaty, was due to Commodore Kearny's wise and resolute action.

This is a bit of our diplomatic history in which naval officers may take justifiable pride. Mr. Hay gave the phrase, "Open Door in China," to the world; but it is seen that the principle was established in 1840 by a wise American naval officer, ably advised by an American consul.

Matthew Calbraith Perry is our most distinguished exemplar of the naval officer in diplomacy. For over two centuries before his expedition to Japan that country had been maintained in a remarkable state of seclusion. In 1636 the Shogun Iyemitsu caused all deep-sea shipping to be destroyed and forbade the building of more. Thereafter the Japanese lived strictly to themselves. Toward the end of the eighteenth century the Dutch were permitted the very limited intercourse of not more than one ship a year, and Nagasaki was the only port open to that extent. The first American vessel to visit Japan was the *Eliza,* under charter to the Dutch, who were at that time, 1797, at war with Great Britain and feared capture of their own vessels on the long voyage to Japan. The Japanese permitted the *Eliza* to fulfil her mission, as did other American vessels on a similar mission during the Napoleonic Wars. It was forty years later, in 1837, that the first serious American attempt was made to establish relations with Japan. It was a private venture and it failed. Eight years later an American shipmaster who had picked up some shipwrecked Japanese thought he might make their return the occasion of a more successful attempt, but he likewise failed. He was told not do it again, and was informed that the emperor preferred to have castaways abandoned rather than have strangers enter Japan. In 1846 Commodore Biddle went to Japan with credentials to make a treaty, but made rather a lamentable failure of his mission. In 1849 Commander Glynn was sent to Japan to demand redress for the ill-treatment of

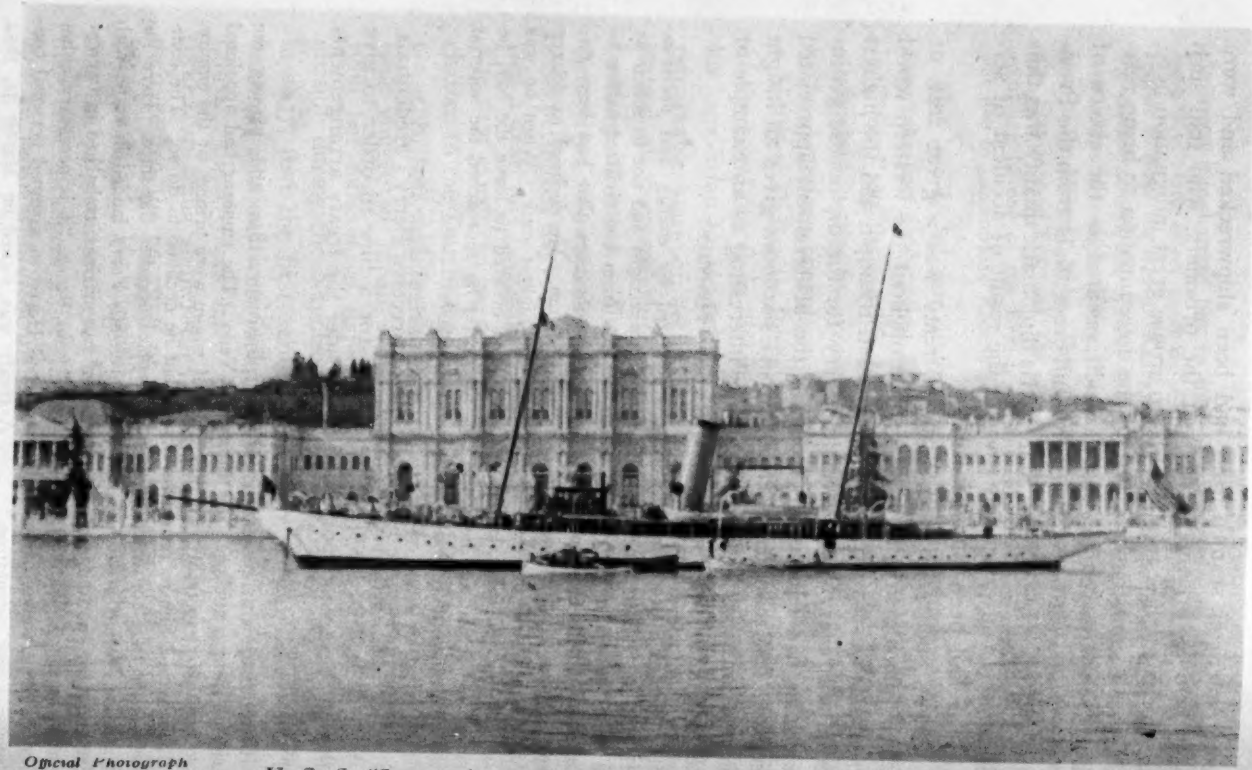
some American seamen who had been shipwrecked and were being held as prisoners. He got the prisoners, who told such dire stories of their treatment as to arouse great indignation here. This was a contributing cause to the determination to bring relations with Japan to an issue, which resulted in the choice of Perry, who went out clothed with full credentials from the President and the Secretary of State. His diplomatic quality was thus deliberately conferred and was not the result of accident of service, as had been that of Kearny.

Perry's success in negotiating a treaty was a great feat, of which Johnson says (*op. cit.*): "Throughout the western world the treaty was hailed as an unsurpassed triumph, and the highest credit was everywhere given to Perry for the diplomatic genius which he had exercised. Nor was the achievement appreciated in Japan less than elsewhere." Moore's account gives an insight into the methods of Perry which is interesting as an example of the adaptation of means to the end. He says:

> His (Perry's) proceedings were characterized by energy and decision. He had, as he said, determined to demand as a right and not to solicit as a favor those acts of courtesy which are due from one civilized nation to another, and to allow none of the petty annoyances that had been unsparingly visited on those who had preceded him. He declined to deliver his credentials to any but an officer of the highest rank. When he was asked to go to Nagasaki, he refused; when ordered to leave the bay, he moved higher up; and he found that the nearer he approached the imperial city "the more polite and friendly they became."

Two princes were finally detailed to receive Perry's credentials. After delivering them he left Japan for a time in order to give the Japanese an opportunity to consider the treaty arrangements he proposed. Moore continues:

> He returned with redoubled forces in February, 1854, and, passing the city of Uraga, anchored not far below Yedo. The emperor had appointed commissioners to treat with him, four of whom were princes of the empire. They desired him to return to Uraga, but he declined to do so. The commissioners then consented to treat at a place opposite the ships. Here the Japanese erected a pavilion, and on March 8th Perry landed in state, with an escort of 500 hundred officers, seamen and marines, embarked in twenty-seven barges. "With people of forms," said Perry, "it is necessary either to set all ceremony aside, or to out-Herod Herod in assumed personal consequence and ostentation." . . . . A treaty was signed on March 31, 1854. American ships were allowed to obtain provisions and coal and other



Official Photograph

U. S. S. "SCORPION" OFF DOLMA BAGTCHE PALACE, CONSTANTINOPLE

necessary supplies at Simoda and Hakodate, and aid and protection in case of shipwreck were promised. No provision for commercial intercourse was secured, but the privilege was obtained of appointing a consul to reside at Simoda. Such was the first opening of Japan, after two centuries of seclusion.

Perry's achievement was of far more than national significance; it was an epochal event of world-wide importance. If in later days it has brought anxious moments to his country as well as self-satisfaction, it was at the time an unadulterated triumph that shed luster on his own name and on the service to which he belonged.

It was more than a quarter century after China and Japan had emerged from their isolation before Korea entered into treaty relations with the western world. Again the United States led the way, and again a naval officer was the diplomatic agent. Quoting Moore (*op. cit.*):

Korea, the Land of the Morning Calm, continued, long after the opening of China and Japan, to maintain a rigorous seclusion. Efforts to secure access had invariably ended in disaster. On May 20, 1882, however, Commodore Shufeldt, U. S. N., invested with diplomatic powers, succeeded, with the friendly good officers of Li Hung Chang, in concluding with the Hermit Kingdom the first treaty made by it with a western power. The last great barrier of national non-intercourse was broken down.

The examples thus far instanced have been drawn from days somewhat remote from our own times—days when wind was the motive power or when steam power was in its infancy in the Navy; when the world was not encircled with cables; when radio was still to be discovered; days, in short, when world communications were primitive as compared with those so familiar now. The marvelous change in the facilities of communication that has taken place in a period of time insignificant in comparison with that covering the history of civilization, even modern civilization, has profoundly modified human relationships, international as well as intranational and personal. As diplomacy is concerned with international relationships, this change is one to be taken into account in considering the subject in hand. It undoubtedly tends toward a centralization of authority, in the State Department as well as in the Navy Department; which is only another way of saying that its tendency is to diminish initiative, and to impose a handicap upon the independence of action

U. S. S. "SCORPION" OFF DOLMA BAGTCHE PALACE, CONSTANTINOPLE
Official Photograph

of officials. The ease of modern communication makes the most resolute and self-confident man think twice before adopting a course of action that he would adopt without hesitation if so situated that weeks or months instead of hours would be necessary for consultation with the home government; while the irresolute or self-distrustful man, or one who fears to accept responsibility, has under modern conditions a ready reason for doing nothing until he can be told what to do. It might, therefore, be thought that modern communications stand in the way of an opportunity for present-day naval officers to engage in diplomatic work. That this is not so a few instances may suffice to show. It is not to be expected that the opportunity of a Kearny or a Perry will rise under modern conditions, but there are other ways in which naval officers may still have an opportunity to do useful diplomatic work.

Thus, some years ago, affairs in China were in a critical stage. The commander-in-chief was Rear Admiral Murdock, now retired. We heard it said that he was the commanding figure of American influence out there, if not indeed of the entire foreign influence. In Washington, where I was at the time, his reports were the standards of information.

In 1905, Captain (now Rear Admiral) Dillingham was intimately connected with the arrangements made with the Dominican Government whereby the collection of customs revenues was done under the direction of an American and the service of the foreign debt was assured. The treaty concluded was not ratified by the Senate, but the President put the arrangement into effect as an interim measure after Congress adjourned, and it proved a great step toward the stabilization of that turbulent little country, and a relief to both it and the United States from the danger of foreign intervention. It served as a model for the treaty of two years later, which was ratified; and that treaty in turn was a model upon which a still later treaty with Haiti was largely based. It is not too much to say that the action of 1905 marked the beginnings of a policy that has been continuously followed since.

Two officers, each sometime president of this college, have within recent years done distinguished diplomatic duty for the country. Rear Admiral Sperry was a delegate to the conference

at Geneva for the adaptation of the principles of the Geneva Convention to maritime warfare, and later was a delegate to the second Hague Conference; while Rear Admiral Stockton was a delegate to the London Conference. . . . At this moment two other officers are holding diplomatic positions as High Commissioners, of both of whom I am happy to be able to speak from personal observation. At Constantinople Rear Admiral Bristol as High Commissioner is doing service of which the nation no less than the Navy has occasion to be proud. Rear Admiral Bristol first went to Constantinople in a strictly naval capacity as detachment commander, the State Department being apparently disinclined to give him any diplomatic functions. Without adventitious aids he soon established for himself such an influential position by sheer force of character, by his intelligent grasp of the situation (which was and is very complicated), and by his alert and careful guarding of the interests of his country and his countrymen that his appointment as High Commissioner followed. Since then his conduct of affairs has been so successful that it is now understood that the State Department is unwilling to have him replaced, and given the relief from his harassing duties which he naturally seeks. It is a proud record.

Quite recently Brigadier General J. H. Russell of the Marine Corps was appointed High Commissioner to Haiti, and it is a matter of some personal satisfaction to believe that the seed of the idea was sown by me over a year ago. The Navy has a double interest in this latest essay of an officer in the paths of diplomacy. General Russell is of the Navy because the Marine Corps is a part of the Navy, and for the further reason that he is a graduate of the Naval Academy and of the War College. I have personal knowledge of the difficulties with which he must contend, and of his high qualifications for his task. It is too early yet to speak of actual accomplishments, but that he will do everything possible in his difficult situation may confidently be expected.

Another recent case of the employment of a naval officer in diplomatic duty was that of Rear Admiral McCully in southern Russia. The force commander was urgently requested by the State Department to spare Admiral McCully's services from the European command in order that he might be able to undertake

the duty. While engaged upon it he reported directly to the State Department as an official under its jurisdiction. It is a source of service satisfaction that Admiral McCully was chosen for his responsible position near Generals Denikin and Wrangel because of his acknowledged unusual acquaintance and sympathy with the Russian people.

Mention must be made of the opportunity that is ever present to a naval attaché to have an influence in diplomatic affairs. From my own limited experience in this kind of duty it is my impression that the weight of an attaché's influence will depend in large measure upon himself, and upon his conception of the range of his duties. If he is alert, and his interest is not confined to technical matters but extends to the currents of national thought and effort of the people with whom his lot is temporarily cast, he may have a very considerable weight in the diplomacy of his embassy or legation. Your president has a much wider experience in this particular than I can pretend to have. As his successor in London in 1919, like him I combined the offices of attaché and force commander, an unusual condition born of the war, under which all attachés in Europe were in a measure subordinate to the attaché in Great Britain. I personally found that naval headquarters in London often had earlier and better information than the embassy, especially from Constantinople and the Adriatic. I was told by General Summerall, the American representative on the Interallied Military Commission that went to Fiume to report upon the unfortunate incident of July, 1919, that he had learned more in his preliminary investigation in Paris from Admiral Andrews' dispatches to me than from all other sources combined, including the French Foreign Office. This was high praise. It will not probably often happen that a naval attaché will have acknowledged credit for diplomatic influence, but I firmly believe that he is in a position to have the reality. In published correspondence dating just before the war I have read dispatches from military and naval attachés of noteworthy diplomatic importance, aside from their military and naval information value.

My reference to Admiral Andrews leads me to speak of the exercise of diplomatic ability in the course of a purely naval command, because that point was so well illustrated by him while

in command of the Adriatic Detachment. I say no more here than I have repeatedly said elsewhere in expressing my conviction that he kept the peace in that sea. . . . By tact and persuasion, combined with firmness and exact justice, through weary months he prevented the tension between the Italians and the Jugo-Slavs in his vicinity from breaking out into open conflict. Surely this was a display of diplomatic qualities of a high order, to which I am the more glad to testify here because they do not seem to have had elsewhere the recognition that they deserve.

Sufficient examples have been instanced to show how naval officers have been, and now are, of diplomatic service to the government. I shall now permit myself some reflections more or less closely connected with the subject under consideration.

It may seem a strange assertion to make in the light of all the postwar conflicts of interest that are so apparent, but I believe that there is a distinct advance in the general attitude of nations as regards foreign relations—one toward the Golden Rule as a governing condition of international conduct. That goal is still far distant, but there has been progress toward it. Let me give you one instance. In September, 1899, when Secretary Hay approached the governments of Germany, Great Britain and Russia with a view to their making "formal declaration of an 'open-door' policy in the territories held by them in China"—to quote Mr. Hay's own words—and later approached the governments of France, Italy and Japan in the same sense, an essential feature of his instructions to our ambassadors and ministers was a recognition of "spheres of influence" on a parity with leased territories. There was no hint that spheres of influence *per se* were undesirable; they were accepted as an existing condition. In the intervening twenty-two years between then and the Washington Conference the conscience of the world had been awakened, and Art. III of the Nine-power Treaty, Relating to Principles and Policies to Be Followed in Matters Relating to China, puts an end to "spheres of influence," a fact that has had surprisingly little notice. The following is quoted from the report of Mr. Balfour's remarks in committee while this subject was under consideration:

> The British Empire delegation understood that there was no representative of any power around the table who thought that the old practice of

"spheres of influence" was either advocated by any government or would be tolerable to this conference. So far as the British Government was concerned, they had, in the most formal manner, publicly announced that they regarded this practice as utterly inappropriate to the existing situation . . . . The words "general superiority of rights with respect to commercial or economic development in any designated region" were words happily designed, as he thought, to describe the system of spheres of influence; and the repudiation of that system was as clear and unmistakable as could possibly be desired.

This Nine-Power Treaty is a new bill of rights for China as well as a formal engagement of the contracting powers among themselves. It marks a great advance over the attitude of only twenty-two years before, and a still greater advance over that of Commodore Kearny, who sought only for his own country equality of rights with Great Britain in China, with no apparent solicitude for any rights of China herself. A similar advance in international ethics may be seen in other directions, often disguised and perhaps with its inspiration in enlightened self-interest as well as moral principle; but I believe that the latter motive is increasingly operative, following the enlightenment of the group conscience of civilized peoples.

My own faith in this matter would not, however, lead me to relax one iota of vigilance if diplomatic duty came my way; for there are still plenty of statesmen and diplomats whose interpretation of the Golden Rule in international dealings is more in accord with David Harum's statement of it than with that of the Scriptures; but if my faith is justified as a general conclusion, then that conclusion must be reckoned with in statesmanship and diplomacy. This is especially true for Americans, and for naval officers as representative Americans, because the United States has been throughout all its history a torch-bearer in international ethics.

The last remark suggests another thought; naval officers should have a thorough knowledge of our own history and traditions, and keep themselves informed to the minute of the evolution of our national policies. It was remarked at the beginning that diplomacy is not the mission of a naval officer; but it may become *a* mission, and a vitally important one. In the light of that possibility officers should have some thought of preparing themselves for the eventuality, should it come, and especially

officers who have attained the higher ranks. Surely there can be no more fundamental preparation than a knowledge of our own history and traditions, our institutions, our outlook upon the world, our time-honored policies, and any evolution leading to a modification of the national viewpoint. The statement needs no elaboration to prove its truth.

Another preparation, important to a less degree only, is a knowledge of foreign nations. The ignorance of and indifference to international affairs of the generality of Americans is as lamentable as it is noteworthy. As a people we have looked in and not out; our attitude toward the world has been parochial. Too many of our people think we can deal with Latins as we do with Anglo-Saxons, with Turks as with Slavs, with Asiatics as with Europeans, or with any of these as we deal among ourselves. Too few appreciate how the people of all nations are becoming more and more citizens of the world, fellow-citizens, and that the United States cannot, if she would, continue to live the life of a snail. The late war has done much to correct this fault, and it is a happy sign that agencies like the Institute of Politics at Williamstown, and courses in international relations in many colleges, have been established in our country; but much virgin ground remains yet to be broken in the intellectual soil of the United States before there can be any expectation of broad general comprehension of our relationship to the rest of the world.

Elmer Davis, one of the editorial staff of the New York *Times*, a man well qualified to speak, has something to say in this connection in a paper on American Influences in Eastern Europe, read before the last annual meeting of the American Academy of Political and Social Science and published in the July (1922) *Annals*. He says:

> Any active, prolonged and effective influence of America on European politics or rather on the complicated political-economic international relations of today, postulates an American public opinion informed on, and interested in, world affairs. Such an opinion does not exist outside of very limited circles. No doubt it is growing, but very slowly. Even when it flashes up unexpectedly under the pressure of immediate economic need, as in the resolution of last winter's Agricultural Conference in favor of participation in the Genoa meeting, it is apt to be poorly informed and misdirected. For nearly a quarter of a century America has had territorial interests in the

Far East; wars in the Philippines, in China and Manchuria, have attracted American interest; our diplomacy has in that field, as in hardly any other, had a continuing and consistent policy. Since 1898, in other words, we have had materials for the formation of a public opinion on Asiatic problems such as we have had for European questions only since 1918. Yet the Washington Conference, and the discussion of the treaties which followed it, showed that even on Asiatic affairs our public opinion was comparatively feeble and uneducated. To expect any general intelligent interest in European affairs for many years to come is rather visionary.

Ignorance of foreign affairs may seem to be a straw man raised to be knocked down when I say that I do not believe that this reproach may be laid at the door of naval officers. My point is that they should shine in this respect by comparison with the great majority of their countrymen on the same plane of education and social station; and specifically that they must keep abreast of our foreign relations and have a knowledge of foreign nations—of their institutions, their policies, and as far as may be of their psychology—to fit themselves for diplomatic duty (the example of Perry in Japan is an instance of adapting methods of psychology). Naval officers have unusual opportunities so to fit themselves, and have little excuse for failure to do so.

I take occasion here to say that opportunity is not synonymous with experience in the sense in which the latter word has been used heretofore in this lecture. In that sense experience is the stored-up knowledge that comes from reflection upon the conditions and events that opportunity has brought to our notice. Reflection upon what we have seen or had a part in is a necessary factor of experience that is to be of value in the future. A much respected brother officer said to me many years ago: "Most people hate to think." The statement may be exaggerated but the underlying idea is true enough. Thinking, reflection, about the matters that opportunity brings to our notice transmutes our observation into real experience that fits us for future occasions. This is as true in the international field as in the naval; in diplomacy as in fleet evolutions.

The place of knowledge of international law in preparation for diplomacy is so obvious that it need only be mentioned. There is one phase of international law that has, however, so much importance in connection with our subject as to be worthy of a few words. I refer to treaties, which do not, perhaps, have all

the attention from officers that they deserve. A reference to the instructions for the guidance of officers in maritime warfare will show how necessary it is to be familiar with treaties in the pursuit of strictly naval duties. In a wider sense our treaties are an epitome of our history and of the evolution of our policies. They show what diplomacy has had in mind in the past. They cover the widest range of subjects that are of interest to us as a nation. They do not cover all, as witness the "Gentlemen's Agreement" with Japan; but generally speaking they are crystallized diplomacy. Our immediate concern as naval officers is naturally with treaties now operative, to be found in *Treaties in Force* and its supplements. As a historical and diplomatic study, however, treaties to which we have been parties but which are not now in force have also a value, and Malloy's two volumes are well forth an occasional hour. Nor need interest be confined to our own treaties. In the past few months I have spent considerable time to my advantage in browsing through MacMurray's two thick volumes entitled *Treaties and Agreements with and Concerning China.*

Every treaty is an international contract whose negotiators perform an act of high diplomatic significance. It is natural to expect that naval officers will rarely be plenipotentiaries for the negotiation of treaties; but they have been in the past and they may be in the future. In ordinary service their observations and reports may well serve to keep the government informed about matters that are likely to become the groundwork of treaties. One such matter is trade, which, in the broad meaning of the word, more than any other one thing forms the subject matter of treaties. By the word trade I mean to include broadly all the agencies for world exchanges, such as banking, transportation and communications, as well as the material things exchanged. We are here in the domain of finance and economics. Now trade in this broad sense, including finance and economics, is a matter into which our professional education does not enter. Yet it lies at the very root of international relations; it is the constant preoccupation of diplomats and governments; perhaps it is not too much to say that on no other one thing does the balance between peace and war so vitally depend. Economic disputes soon become political, and in my opinion no greater

nonsense has been uttered of late than the attempt to differentiate between economic and political predominance, of which we have heard not a little within the past few months.

It would be going far to advise officers to make a deep study of finance, economics and the laws of trade in order to prepare for a very improbable chance to employ such knowledge in diplomatic duty. But every intelligent citizen should have some knowledge of these subjects, and we hold ourselves as being in the intelligent class. The knowledge can do no harm, even if it only serves to give a broader and more understanding outlook on the world.

Although somewhat removed from the immediate subject of the lecture, you will perhaps pardon reference to a personal experience that opened my eyes to the advantages of knowledge not confined to strictly naval limitations. When it fell to me to become Military Governor of Santo Domingo, events so shaped themselves that the entire executive and legislative functions of government rested in my hands. My problems were principally those of civil administration and civil policy. If I had known more about finance and economics I should have been spared many anxious hours. Often and often I wished that my leisure hours in previous years had been less filled with novels and more with what would have been of inestimable value in fitting me for my responsibilities for the welfare of a nation of nearly a million people.

It may seem to you that undue stress has been laid upon a phase of the work of naval officers that is not usual—one that may never come to any of you; that there has been a lack of proportion in its presentation. That may, indeed, be true, for the temptation is great to let one's subject loom large in the preparation of a lecture, but if true it is not by intention; for I think that the naval mission in the life of the naval officer is his all-important mission—that, however successful in endeavor outside of strictly naval lines, if he fails of complete success within them he falls short of the professional goal. I hope you will agree with me, upon reflection, that, with the exception of trade, the other high points mentioned in self-preparation for diplomatic work are all more or less essential features of a naval officer's mental and intellectual equipment—a knowledge of our

own history, traditions and policies, and of those of other nations; the necessity to apply thought to opportunity and observation in order to crystallize them into useful experience, and a knowledge of international law and treaties. That these are useful and requisite in diplomatic work simply adds to them another interest; it does not mean that naval officers must go into broad and unknown fields of attainment in order to prepare for a possible chance of usefulness that probably never will arise. Of trade, even, I am sure none in this audience would take pride in asserting entire ignorance.

During the preparation of this lecture the thought has arisen time and again that the officers and men of the Navy are in a very real sense doing diplomatic work daily in so far as they meet foreigners—doing it well or ill as they represent well or ill American standards. Any American abroad is representative in a sense; naval officers, and enlisted men too, are official representatives in a way they can not escape if they would. The diplomacy they exercise in routine daily life will be unconscious. It will not be in the way of outstanding incidents, nor recorded in international archives, but each act touching a foreigner will be an infinitesimal element of the sum total of our foreign relations, as the individual drops of water make the ocean. In all probability it will be given to none of us to be a Foch of diplomacy, but we may all give daily and worthy service as privates. Perhaps this may seem a trivial conclusion to a subject of some weight; my excuse is the persistent recurrence of the thought in my mind.

DANGER OF DISARMING AMERICA

From a Naval Officer's Viewpoint

By Captain L. M. Overstreet, U. S. Navy

AS A CONGREGATIONALIST, as well as a naval officer of many years' service, I feel it not inappropriate to discuss with churchmen the great question of naval disarmament.

The Christian people of America should strive to put an end to war. But how? Can this be done by universal disarmament, disarmament by example, by limitation or can it be done at all? Our forefathers considered the safety of our country of such importance that one of the reasons for establishing the Constitution of the United States was in order to "provide for the common defense."

In a discussion of "Mob Psychology" Professor Hocking of Yale tells us that the crowd is quick to accept simple emphatic statements often repeated. The crowd wants neither historical facts nor logical reasoning.

The purpose of this paper is to point out the danger of pernicious "slogans of delusion" which are accepted blindly by many thoughtful people.

Disarmament will insure peace.—At the close of the Revolution we put total naval disarmament into effect. In 1785 we did not have a single fighting ship. This did not bring peace. The Algerians captured our cargoes of wheat which were sent into the Mediterranean. Congress was thus forced to make its first appropriation to build men-of-war. We paid a ransom to Algeria for the return of our captured crews. We even paid tribute until our first fighting ships could be constructed. Some will say that we do not have pirates today. A great nation of four hundred million peace-loving people, China, is forced to pay ransom today for the return of her own territory because she has no navy with which to drive off her aggressors.

Disarmament by example.—America did disarm the navy in

1785 but no other country followed her example. We have practically disarmed our army today but other nations of the world have not followed suit.

The great powers of the world accepted our recent invitation to attend a conference on the limitation of armament because we were constructing fifteen superdreadnoughts which if completed would have given us the most powerful navy in the world. Had an impotent nation like China called the conference the world would have laughed and none would have accepted the invitation.

The late Theodore Roosevelt uttered these ringing words:

> Let us realize that the words of the weakling and the coward, of the pacifist and the poltroon, are worthless to stop wrongdoing. Wrongdoing will only be stopped by men who are brave as well as just, who put honor above safety, who are true to a lofty ideal of duty, who prepare in advance to make their strength effective, and who shrink from no hazard, not even the final hazard of war, if necessary, in order to serve the great cause of righteousness.

Although our military force is small, backed by federal government, it has sufficient invisible power to keep the American flag flying throughout the land. The Secretary of War, John W. Weeks, has pointed out that if we remove the military power back of the government, we lose the civilization we have fought for over two thousand years to establish. Boston reverted to a state of barbarism within two hours after the policemen of that city went on a strike.

America is menaced by militarism.—America never has been, and is not now menaced by militarism. The people in the United States hardly know that we have an Army and Navy until some disaster arises. Our military men prefer to put on civilian garb and quietly lose themselves in the crowd, until their services are called for by the people.

A recent article quotes the ex-Crown Prince of Germany as stating that when his father sent for him as a youngster, he marched into his presence and stood at attention, much as a sailor marches in before the captain of a battleship. The Crown Prince was required to stand with his hands clasped behind his back lest, in some childish way, he might knock a paper from his august father's desk. He was brought up a Prussian. Have the fathers and mothers of America so brought up the men of their navy?

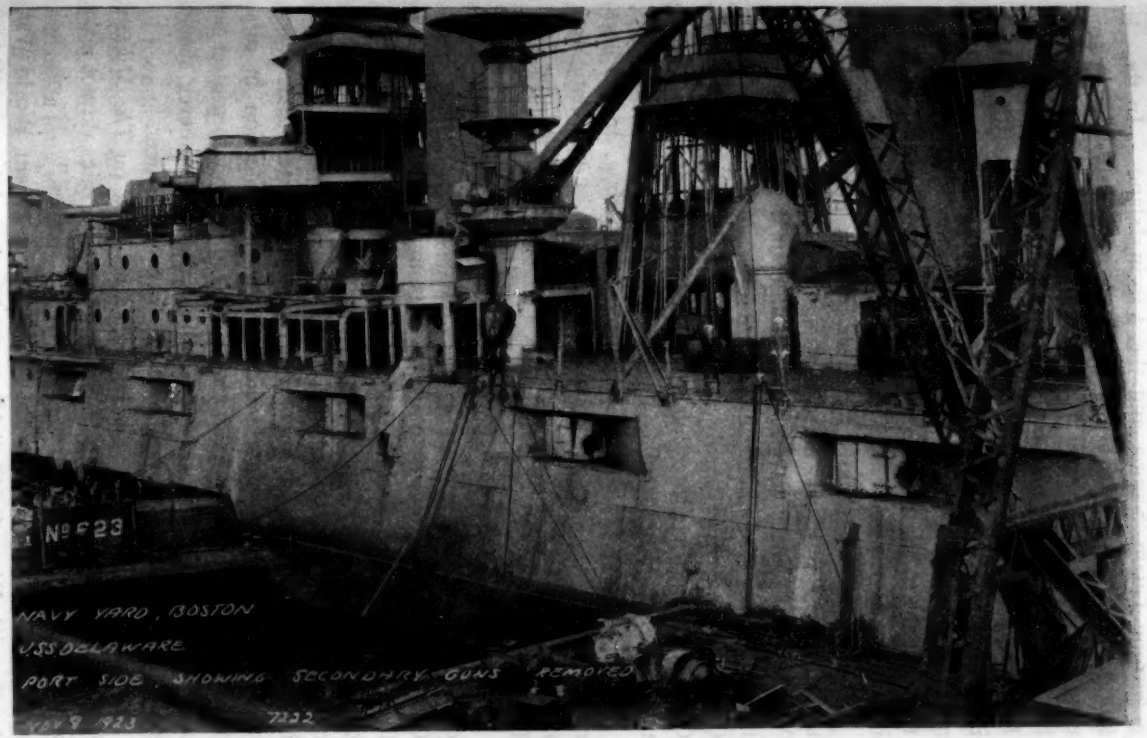
Imbued with the spirit of '76, the mothers of a British colony gave their boys that there might be a free America. Many women (and men) of today are subscribing to the slacker's oath, pledging themselves to be disloyal to their country in the event of war. Is this the spirit of today? If so, as a patriotic woman has put it, "Will these women place a statute of Mrs. Bergdoll, mother of the notorious slackers, in the Hall of Fame as the Susan B. Anthony of this movement?"

Our President is responsible for safeguarding the lives and property of over a hundred million people. Every President, from Washington to Harding, has consistently urged Congress to provide a strong Navy. Would it not be wise to take this advice?

Heavy taxes for war but little for education.—Those who would wreck our military forces love to say that some ninety per cent of the taxpayers' money is expended on war, while less than ten per cent is devoted to education. These people are evidently talking of congressional appropriations only. The taxpayers carry four separate and distinct burdens. That is, they carry national, state, county and city budgets. It is the duty of Congress *alone* "to provide for the common defense," but it is *not* its duty to provide for education. How unfair, then, to compare the amounts Congress appropriates for war and for education!

Armed forces are entirely destructive.—This also is a slogan of delusion. Our military forces are constructive. Wherever they go they insure good order, stable government, good sanitation, improved health and increased educational facilities.

The Army made the present Cuba, Porto Rico, Panama Canal Zone and the Philippines. The Army has established schools, public works and sanitary organizations. Malaria and smallpox have nearly disappeared in Cuba. Major Walter Reed discovered a remedy for yellow fever, which had swept away thousands of lives in Cuba and even in our southern cities. General William C. Gorgas converted Panama from a pest hole into a health resort, so that General Goethals could build a great canal. Major Bailey Ashford eliminated tropical anemia in Porto Rico, and this one thing saves more lives annually in Porto Rico than were lost in battle and from wounds in the Spanish-American War.



U. S. S. "Delaware," The End of a Fine Ship

The Navy expends about a million dollars of its money annually governing Guam, Samoa and the Virgin Islands. In these islands the schools have been increased, good sanitation systems established and the general health improved. Infant mortality has been reduced from 325 to 207 per thousand in the Virgin Islands. Samoan native girls have been sent to America for training in naval hospitals. Natives from Guam are sent annually to agricultural colleges in the United States. The lepers are sent from Guam to the Culion leper colony in the Philippines, which is the greatest leper colony in the world.

The Navy also spends some ten million dollars annually to maintain the gunboat patrols along the China coast, up the Yangtze and Canton Rivers, and throughout the West Indies, and the destroyer patrols in the Eastern Mediterranean and Black Seas. Our churches could hardly send missionaries into the heart of China but for the protection afforded by gunboats, which patrol nearly two thousand miles up the Yangtze River.

Naval officers are students of international law, and of international affairs. They are constantly engaged in diplomatic work throughout the world—carrying out the policies of the State Department.

In 1920 our overseas exports were valued at over seven billion dollars, while our imports were valued at nearly five billion. Our government could no more protect our oversea trade and the thousands of Americans residing in all parts of the world without the Navy, than could a mayor protect the inhabitants of a city without the assistance of the police and the fire departments. In fact, lawlessness has increased to such an extent that governors are organizing state police to afford protection in rural districts. Those who think we do not need a Navy to protect our citizens abroad and our twelve billion dollar commerce should experiment by the abolition of their own city police.

Armed forces cause war.—Upton, in his book on *The Military Policy of the United States,* shows us that "armies do not make war," but on the contrary, "wars make armies." If you look back and try to determine the causes of the recent World War, the Spanish War, the Civil War, the Mexican War, the War of 1812, the Naval War with the French in 1789, and even the war of the American Revolution, you will find that not one of these

was caused by our military forces. We have raised our armies after the *people* have declared war. Some fall back on the statement that Germany was prepared and that caused her to go to war. In the first place, Americans are not Prussians, and in the second place, it would be impossible to substantiate this statement.

We have entered each foreign war when our national policies have clashed with those of our opponent. Our military forces have had nothing whatever to do with the formation of our policies.

Conclusions.—No plan of disarmament will ensure peace. Until human nature changes men will fight whenever they feel they have a cause, regardless of weapons. Human nature has not changed in many thousand years—in fact, since Cain slew Abel. Wars are caused in general by the hatreds and the jealousies which have always existed in the heart of man and by economic rivalries. New wars will doubtless arise from these same causes, and particularly from strife over the acquisition of raw materials, such as oil, coal and iron, the bases of industry and of economic wealth.

The danger of war can be lessened only by preparedness and by international agreement. By calling the recent reduction in armament conference, America dispelled certain gathering war clouds. If America remains a first naval power she can call more such conferences. Without a first Navy she cannot call another one, and even if invited to attend one called by a first naval power, she will wait outside until called in. The big four fighting powers drew up the Treaty of Versailles. The minor fighting powers waited outside and were called in when the treaty was ready for transmittal to Germany and shown where to sign. This procedure is common practice. History *always* repeats itself.

I have hesitated to write to a church paper on the question of disarmament, for it seems like addressing an unsympathetic audience. Men of the Navy feel keenly the fact that many of our churchmen look upon them as seekers of war and bloodshed. We are of the people, merely patriotic American citizens impelled by proper motives to uphold the flag we all love. We strive to carry out the wishes of the people, and go to war *only* when they send us. We restore peace after the people have declared war.

Rev. Marion D. Shutter, D.D., Church of the Redeemer, Minneapolis, in a splendid address on "The Army of the United States as a Constructive Force," said in part (*Congressional Record*, March 17, 1922):

> In these days of discussion about armaments—naval, land and air—days in which doubts have been raised about their value, days in which in some quarters there is a demand for scrapping them all without further debate—it is well to keep our heads. There never has been an epoch in which the salvation of the world's civilization was so swiftly followed by attempts to discredit and degrade the means of that salvation. Armies are now thought of, even by the best informed, as simply and only agencies of destruction; the soldier is stigmatized as one whose sole trade is slaughter. Odium is constantly thrown upon his calling. The country is so insistent upon peace that investigating committees are formed to smirch the men who made it possible. "Statesmen" make war, soldiers make peace. To be logical we ought to scrap the "statesmen."

When I was engaged as a midshipman in the battle of Santiago and as the captain of a transport during the recent war taking troops to France, I thought I was carrying out the expressed wishes of the Christian people of America. I may be the bloodthirsty Prussian some people picture a navy man to be, nevertheless my character was formed each Sunday morning of my boyhood days as I sat in a small Congregational church on the prairies of Nebraska.—Reprinted from *The Congregationalist* of February 1, 1923.

THE PEACE TIME SERVICES AND COSTS OF THE NAVY[1]

By Captain H. E. Yarnell, U. S. Navy

Mr. President and Gentlemen:

Before beginning my remarks I desire to express to you the sincere thanks of the Navy Department for the courtesy extended through your invitation to the Assistant Secretary, Mr. Roosevelt, to address you this evening, and it is much to be regretted that he was not able to accept due to the pressure of other engagements. He inherits from his distinguished father the talent of expression, and a deep love for the Navy, which, could he have been present, would have insured for you an interesting evening and for the naval service, many new friends.

The name of your state is one familiar to the naval service. The armored cruiser *West Virginia* which was commissioned in 1905 was the flagship of a division of four similar vessels which was sent to China in 1906 under the command of Rear Admiral W. H. Brownson, and until the World War, this vessel served as a flagship on the China and Pacific stations. Her name was changed to the U. S. S. *Huntington* when the present battleship was named the *West Virginia,* and under this name the *Huntington* served as an escort for trans-Atlantic convoys during the World War.

The battleship *West Virginia,* now building at Newport News, will be placed in active service in December, and will enjoy the distinction of being the last battleship to be commissioned in our Navy for a period of more than ten years under the terms of The Disarmament Conference. This vessel carries eight sixteen-inch guns, the largest now permitted under the terms of the conference, and will remain for a decade the last word in naval construction.

West Virginia has contributed her quota to the distinguished

[1] An address delivered before the West Virginia Manufacturers' Association at Huntington, W. Va., November 1, 1923

names of the naval service. I will allude to but one, that of Rear Admiral French E. Chadwick, the commanding officer of Admiral Sampson's flagship during the Spanish War, a fine seaman, and an author of ability who was graduated from the U. S. Naval Academy in 1864 and died in 1919.

When I was requested to act as substitute for Mr. Roosevelt, and address this audience on the subject of the Navy, I was rather perplexed as to the manner in which to discuss it. The Navy is a complex organization and a large volume would be required to discuss it in its entirety with its many ramifications. I concluded finally that there is one phase of the subject which would interest you as able, intelligent, representative citizens whose taxes go to maintain it, and that is: What do we maintain a Navy for? What purpose does it serve in time of peace? Is it worth what it costs? Cannot some substitute be found for this apparently unproductive factor in our government? These questions are proposed, not as straw men, set up for the purpose of destroying them, but because there is a strong tendency in our country today to reduce the Army and the Navy to a point so low as to be considered dangerous by those who would be charged with their operations in time of war. These and other questions I will discuss not only from the viewpoint of the naval officer but from that of one who is a citizen like yourselves, and is profoundly interested in any practicable method that will reduce the probability and the terrible cost of war.

In the annual report for 1922 of the Secretary of the Navy, he states the following as the fundamental naval policy of the United States: "The Navy of the United States should be maintained in sufficient strength to support its policies and its commerce, and to guard its continental and overseas possessions."

This broad general policy should be true for all times and under all conditions.

The foreign policies of the United States that are of the most importance are the following: (a) The Monroe Doctrine; (b) restriction of Asiatic immigration; (c) the Open Door policy in China, and (d) restriction of European immigration.

It will be 100 years on December 2 when President Monroe in his annual message to Congress stated that "the American continents, by the free and independent condition which they

have assumed and maintain, are henceforth not to be considered as subjects for future colonization by any European powers."

At the present time there is little danger of any European power making such an attempt. Changed conditions in Europe and the growth in power of the principal South American countries have brought about a state of affairs entirely different from that which existed 100 years ago.

One feature of the Monroe Doctrine which probably was not anticipated by President Monroe was our resultant responsibility for the external affairs of the Central and South American countries which became involved in disputes or controversies with European nations. This has led in the past to our occupation of Haiti and Santo Domingo, and in these countries there is an arm of the Navy, the Marine Corps, in charge, building roads, introducing sanitation, and insuring for the first time in their history an honest and efficient government.

Since the '80's Chinese immigration into this country has been forbidden by an Act of Congress. Also for a number of years Japanese coolie immigration has been restricted through a "gentleman's agreement" between this country and Japan. Here we have a policy that will last only so long as there is an armed force to support it. Can you imagine the crowded millions of the East with a vision of the great, fertile unoccupied spaces in the United States, and the comparative wealth they would achieve, once entry was attained, paying the slightest attention to an Act of Congress that was not backed by an Army or Navy? The population of Japan increases at the rate of 700,000 a year. The country is already terribly crowded. What to do with this surplus population is one of the greatest problems of Japanese statesmanship.

Murmurs of discontent in Europe over the restrictions now enforced against the immigration of their nationals are now arising. This policy is one that is bound to give rise to many causes of friction between the United States and other nations in time to come. Yet if we open our doors to the surplus population of the world, the day will surely and quickly come when the mass of our people will sink to the level of poverty and toil that now exists in those countries. It may be selfish on our part to wish to maintain our standard of ease and comfort, but

U. S. S. "West Virginia" Leaving Navy Yard, New York, for a "Shake-Down" Cruise

it is human nature, just as surely as it will be human nature that breaks down the barriers when our strength departs.

The Open Door policy was first stated by Secretary of State John Hay with reference to China and has been affirmed by his successors. This policy was formally accepted by the nations taking part in the Disarmament Conference in Washington in 1922.

This is a policy that should appeal especially to the members of this association. As manufacturers, you have a primary interest in markets. In 1922 the value of exports from this country of manufactures ready for consumption was well over a billion dollars. The Open Door policy is designed to give you an equal opportunity with other nations in the markets of the world. In China with its population of 400,000,000 people is a potential market whose future possibilities are incalculable. You have only to read the economic history of China and Manchuria for the past twenty years to realize that the Open Door policy will never be maintained without the backing of an adequate Army and Navy.

I think I am safe in stating that we maintain a Navy for the purpose of supporting our national policies, and that without it these policies are worth only the paper on which they are written. This is the primary function of our Navy in peace and war.

I can give you many other secondary functions the Navy serves in time of peace. It is a great technical and industrial school and I dare say has turned out more skilled mechanics, electricians, carpenters, radiomen, painters, blacksmiths, boilermakers, coppersmiths, cooks and bakers than all similar schools in the United States combined.

When great tragedies such as the San Francisco, Messina, and Japanese earthquakes take place, the Navy is first on the spot to render aid and preserve order. At Messina in 1909 an entire city of temporary houses was built by the U. S. Navy to shelter the homeless Italians. It protects our commerce in the West Indies and our missionaries in the interior of China. It has made the name of the United States a household word in the Near East and Turkey through services it has rendered to the homeless and starving multitudes. A naval officer, Rear Admiral Mark

U. S. S. "West Virginia" Leaving Navy Yard, New York, for a "Shake-Down" Cruise

L. Bristol, has served as high commissioner in Constantinople for five years, and his services have been so valuable that the State Department has refused to release him for other duty.

In terms of money the Navy costs about $300,000,000 a year or $3.00 per capita. Its cost is about eight per cent of the total national expenditure. The state, county, township and school taxes paid in the United States are considerably larger than that collected for the national government. Your automobile tax is probably five times greater than your annual contribution to the support of the Navy. Wipe out the entire naval appropriation, and I do not believe you would notice the result in decreased taxes. The people of the United States spend over a billion dollars annually for candy, chewing gum, and soft drinks. In the face of that spending power on luxuries, the cost of the Navy cannot be considered as a burden.

As to the size of the Navy that we should maintain, it should be adequate to uphold the policies that have been accepted as necessary for our national security and welfare. A larger Navy is unnecessary. A smaller Navy is dangerous. The task of deciding upon the requisite strength rests with the Congress and the executive authorities in Washington.

In the world today there are many able minds devoted to the problem of how to reduce the probability of war, and the reduction of armaments. Such efforts should receive the support of every person who has at heart the future of our civilization. Is it not a tragedy that after nearly twenty centuries of the Christian religion its doctrine, "Peace on earth and good will toward men," the nations have no final method of settling their disputes except by wholesale official slaughter? Naturally there are various methods proposed by which a reduction in the probability of war may be brought about. One method that has many supporters is for the United States to reduce and finally eliminate the Army and Navy, under the assumption that these forces are the causes of war.

This is the "disarmament by example" school. The causes of war lie deeper than in the presence of armed forces. Selfishness, greed, ambition, self preservation, are human traits that must be eradicated to make war impossible. When the police force of Boston goes on a strike, the "Hub of the Universe" instantly

is at the mercy of the murderous, looting mob of cut throats and ruffians. China has no Army and no Navy. She has been the prey of predatory foreign powers for thirty years.

The United States tried total disarmament at the close of the Revolutionary War, our only war vessel being presented to France. A few years later we were paying tribute to the Barbary pirates to permit our commerce to go unmolested, and to ransom our citizens who were held as prisoners in African prisons.

As a result of our almost total disarmament policy prior to the War of 1812, our land forces were defeated in a number of battles, our coasts ravaged and our national capitol burned.

Another method which already has had far reaching effects is that of "relative disarmament" as embodied in the results of the Disarmament Conference at Washington in 1922. I consider this conference as having done more to make war more distant than any other conference in history. It did not achieve the full success that was hoped for, but this was due to no fault of the United States, or of those that represented us. The limitation of tonnage applied only to capital ships and aircraft carriers leaving the tonnage of other types unlimited. Also no attempt was made to reduce the armies. However it is believed in time to come these will be limited to certain ratios and tonnage as has already been done with capital ships.

Future disarmament, and reduction of the probability of war will depend primarily on the extent to which national and individual morality, intelligence, and forbearance are developed. For years in Germany the principle was taught that the state was not bound by the same moral laws that bound the individual. The mission of the state was to further the comfort and security of the individual, and any method of accomplishing this mission was justifiable. This policy insured her failure in the war as the ruthless invasion of Belgium turned the world against her.

I think we Americans can justly pride ourselves that our nation leads in the attempt to establish a higher standard of international morality. We covet nothing that belongs to others. We want nothing more than to see the European nations adjust the indifferences and live in peace with one another.

The press of a country has an enormous influence in swaying

the populace for or against war. I have heard the statement that had it not been for the yellow press in 1898, President McKinley would have been able to arbitrate the differences that existed between Spain and this country and war would have been avoided. A newspaper that is constantly preaching hatred of other nations, or always enlarging upon the probability of war is a public menace.

By raising the standard of intelligence of the people, much can be done to avert war. Let our histories be written impartially, giving the facts on both sides, and in future times of stress the public mind may be governed by the rule of reason and not by the rule of the mob. Let us suppose that for the period from 1870 to 1914 the youth of Germany had been taught the principles of "peace and good will" with the same intensity as they were actually taught those of Pan-Germanism and world power. We can only speculate, but I dare say the world would be different today had such been the case.

Naval officers are rather matter of fact individuals who during their career deal with concrete facts, and they are apt to be swayed more by the history of the past and conditions as they exist than by the hope for possibilities of the future. By all the laws of chance, history tells us that sometime we will have another war. Who the enemy will be we do not know. It may not take place in our lifetime, or in that of our children, but, as far as I know, there is no recorded case in history where a great nation at the zenith of its power has continued to the end of its allotted existence without war. What we in the naval service dread is a repetition of the days following the Civil War when for twenty-five years the Navy was a negligible quantity; the ships were old wooden vessels armed with smooth bore guns at a time when foreign nations were taking every advantage of the development that had taken place in naval warfare during the struggle between the states. There is no more expensive burden on a state than an inefficient Navy. Furthermore, it is only fair to the men of the Navy that when the time comes for them to risk their lives, they have at least a fighting chance, and not be sent forth like sheep to the slaughter as were the crews of Cervera and Rojestvenski.

For the first time in history, we have a definite policy regard-

ing the size of the Navy. It is to be equal to that of Great Britain, and one and two-thirds as large as that of Japan. This policy has been approved by the Senate which has ratified the treaty. At the present time our Navy is not up to the established standard. It takes more than battleships to make a well rounded fleet, and at the present time we are short in certain types, such as mine laying submarines, scout submarines and scout cruisers. In the latter type of vessel, Great Britain has thirty-five while we have ten. The Washington Conference placed no limit on the number of light cruisers, destroyers, submarines, or aircraft that may be constructed and it must be remembered that the ratios established apply only to battleship and airplane carriers.

A strong effort was made in Congress last winter to reduce the enlisted personnel of the Navy from 86,000 to 67,000. The personnel of an army and navy is the foundation and framework upon which the armed forces in time of war must be built. When we entered the World War, the highly trained crews of the battleship fleet were stripped of their gun pointers and skilled men to form armed guard crews for merchant ships. For months afterward our major ships were in no condition to enter battle. During this time the British fleet stood between us and the enemy, but we obviously cannot rely on similar protection in the future.

At the present time we have nearly 200 destroyers out of commission which must be manned at the outbreak of war, and will require 25,000 officers and men. The personnel of the Navy is a highly trained, technical organization which cannot be improvised in an emergency. The naval reserves will form the flesh but the regular service must supply the bone and sinew.

The personnel of the Navy comes from every state and from every walk of life. No body of men more truly representative of the people of the United States can be imagined. There is no military caste in our country and there never will be.

The strength and efficiency of the Navy in the final analysis depends on the views and opinions of the citizens as represented here tonight. If you want an adequate Navy you can get it. On the other hand, if you are indifferent as to its strength and efficiency, your views will be immediately reflected in reduced appropriations.

All of you are men whose minds are capable of interpreting world conditions as they exist today. In your sane judgment are these conditions such as to justify indifference and neglect of the Army and Navy of the United States? Much of what I have said applies to the Army as well, the sister service which with the Navy provides for the common defense.

During the Venezuelan dispute with Great Britain in 1895, after the efforts of the State Department had failed, President Cleveland referred the whole matter to Congress and pointed out that there must be a settlement, closing his message with the following language:

> In making these recommendations, I am fully alive to the responsibility incurred, and keenly realize all the consequences that may follow.
>
> I am, nevertheless, firm in my conviction that while it is a grievous thing to contemplate the two great English-speaking peoples of the world as being otherwise than friendly competitors in the onward march of civilization, and strenuous and worthy rivals in all the arts of peace, there is no calamity which a great nation can invite which equals that which follows a supine submission to wrong and injustice and the consequent loss of national self-respect and honor beneath which are shielded and defended a people's safety and greatness.

The day may arrive when armies and navies are no longer required, but, until that time arrives, insure to the government the means of following its destiny, with safety to its citizens and honor to its principles.

CONDITION OF THE AMERICAN NAVY

By Lieut. Comdr. Sidney Ballou, U. S. N. R. F.

THE RECENT agitation over the Navy has left the average citizen in a state of bewilderment. He is not quite certain whether our fleet is the pride of the ocean or headed straight for the junk pile. As usual, the truth lies between, and while it does not produce the glow of satisfaction of the one view, nor make sensational reading like the other, it nevertheless should be interesting to all those mindful of the national defense.

It is very easy for an enthusiast with one idea to mount that hobby and ride amuck through naval statistics. If one has a notion that speed is the greatest thing in a battleship he pays scant attention to the fighting qualities that have to be sacrificed to get speed. He talks of a foreign fleet "sailing circles" around our own as though that maneuver, often enough repeated, was all that was necessary to compel abject surrender. If he is an aircraft enthusiast he would scrap all guns that shoot horizontally and armor placed vertically in favor of vertical guns and horizontal armor. If submarines have been designed to protect our coasts and harbors it is easy to demonstrate how lamentably weak they are if asked to accompany the battle fleet, which was designed for a quite a different purpose. And so through a very considerable list of recent criticism.

The Navy is a complicated instrument, composed of ships of many types built over a series of many years, each ship designed for some main purpose, but representing a necessary compromise in desirable qualities and often a compromise in conflicting opinions. It is not strange, therefore, that there are divergent opinions as to what is most important in purpose and best in design, nor that, with the best of opinions, no one formula will dispose of the whole question of naval strength.

Capital Ships—In spite of the predictions of a long line of torpedo boat enthusiasts, submarine enthusiasts and the present

aircraft enthusiasts, the capital ship is still, and is likely to remain, the backbone of the navies. From time immemorial wars have been won by the force that is able to give and take hard blows. "War," says Mahan, quoting Napoleon, "is a business of positions," and wars are won by taking and holding one important position after another. On land this ultimate force is represented by the slow moving infantry, on the sea by the slow moving battleship. No force designed merely to inflict damage and retire, no force incapable of consolidating and holding a position once taken—in a word, no force of the "hit, dodge and run" type ever yet won a war.

At the Washington Conference the ratio of 5-5-3 for the United States, Great Britain and Japan, with 1.75 for France and Italy, was established for capital ships and aircraft carriers. Weighing carefully the fighting value of existing capital ships, Great Britain was left with twenty-two, the United States with eighteen, and Japan with ten. Great Britain can at once build two and scrap four, leaving twenty. After a lapse of years, older ships are replaceable with a standard 35,000-ton type until the numbers become fifteen, fifteen and ten.

Speed—The term capital ship includes battleships and battle cruisers. The latter are much faster, but for this speed they sacrifice number of guns and considerable thickness of armor. Four British and four Japanese ships are battle cruisers.

Useful as battle cruisers may be for special emergencies, no American commander would sacrifice any of his battleship strength for this type. Hard hitting and the ability to stand hard knocks are the ultimate qualities of a fighter, and in these the battleship greatly excels. Three great battle cruisers went to a tragic doom at Jutland, but the battleship *Warspite,* while temporarily unmanageable, survived a severe hammering by the German fleet, while another—the *Marlborough*—showed that one torpedo cannot sink a modern dreadnaught.

The eighteen American battleships are built to a standard speed of 21 knots. The six Japanese battleships are built for 23 knots, and their four battle cruisers, of course, faster still. Great Britain, besides her battle cruisers, has a squadron of 25-knot ships, another of 23, and a third of 21.

For all practical purposes the speed of the battle line is the

speed of the slowest ship. The tactical advantages of a "fast wing" are highly problematical. On the basis of the slowest squadron, Great Britain and the United States are equal, and Japan two knots faster. It must be repeated, however, that some other quality, usually thickness of armor, has been sacrificed for excess speed, and that wars are won by hitting and not by running.

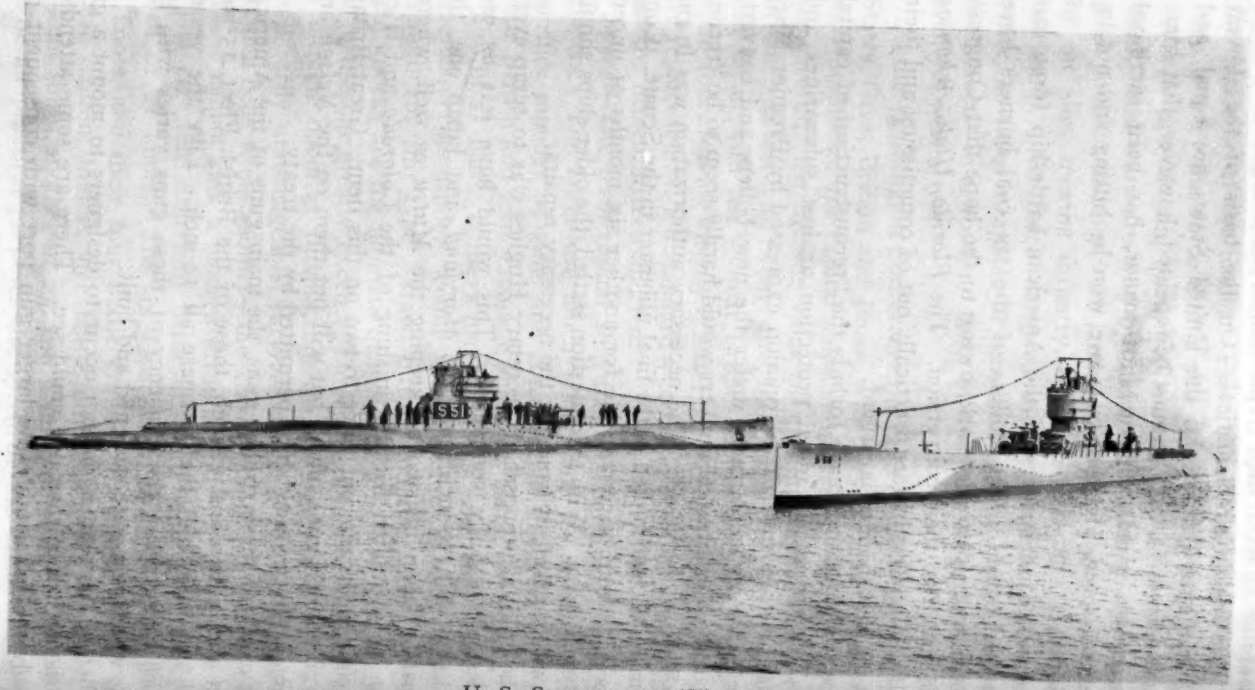
The twelve oil burners of the American battleship force can make their speed. The boilers of the six coal burners have not been kept up to the mark, owing to the hope that Congress would authorize their conversion. The *Florida, Utah, Arkansas* and *Wyoming* are, in fact practically out of commission and their need for new boilers is urgent.

The Washington Treaty forbids the "reconstruction of capital ships," except to fit added protection against submarines and aircraft, but, in spite of the opinion expressed by Premier MacDonald, putting oil burners under the new boilers and converting coal bunkers into oil bunkers would hardly seem to be "reconstruction" of the vessel. The necessary authorization was in the last naval bill, which died in the final filibuster in the Senate. Congress is, therefore, responsible for another six months of uncertainty and delay. With this question settled, the older ships should and will be taken in hand for the necessary repairs.

The original proposal of Secretary Hughes was to scrap every battleship not fully completed. This would have left us one battleship with 16-inch guns, the *Maryland,* and Japan one, the *Nagato.* Japan insisted on keeping the *Mutsu* as well, whereupon we stipulated for the finishing of the *Colorado* and *West Virginia,* and came out three to two on this item. Great Britain has no 16-inch guns afloat, but will put them on the *Nelson* and *Rodney,* the two new ships permitted by the treaty.

Except for these 16-inch guns, the main guns of the American fleet are 14-inch and 12-inch, those of the British Fleet, 15-inch and 13.5-inch, and the Japanese all 14-inch. Like the vessels which carry them, the efficiency of these guns varies with the date when they were designed and built.

Before the war, it did not occur to designers to mount a gun to shoot further than one could see. There are some attendant disadvantages, notably the larger gun port with consequent de-



U. S. Submarines, "S"-Class

creased protection to the gun. Fifteen degrees was the standard maximum elevation, and all our pre-Jutland ships, thirteen out of eighteen, are so designed.

Standard books of reference give no intimation that any British ships prior to the *Queen Elizabeth* class had more than this maximum. When, therefore, we learned that all British battleships retained under the treaty had twenty degrees elevation we naturally concluded that the earlier ships had been altered. Upon this statement Congress passed an appropriation to increase the elevation of our own guns. Thereupon the British Admiralty informed us that no change of this kind had been made since their ships were built. While the final result was the same, the Navy Department declined to spend money obtained under a misstatement and the appropriation lapsed.

The present situation, therefore, is that all British guns can shoot 23,800 yards, while many of ours are limited to 21,000 yards. There is a danger space between in which all twenty British ships would be in action against ten or twelve American ships. Now 23,000 yards is thirteen miles, and at these ranges only the tops of the mast heads would be visible from each other, but, nevertheless, with modern shooting this is a situation not to be overlooked.

The claim has been made in Congress (not by any foreign power) that an increase in elevation of guns would be a violation of the Washington Treaty. The exact wording of the only clause applicable is—"No alteration in side armor, in caliber, number or general type of mounting of main armament shall be permitted." The French version, which is equally authoritive, forbids, literally translated, all changes in the "caliber and number of guns in the main armament as well as all changes in its general plan of installation." The point that a change in maximum elevation is a change in the general type of mounting (English) or in the general plan of installation (French), does not appear to be well taken.

General Modernization—In the running fight off Dogger Bank, the *Blücher* was sunk at the then unprecedented range of 18,000 yards, the shells dropping through her deck from vessels invisible to her gun crews. Following this, with spotting from airplanes rapidly developing, the ideas of designers underwent a radical change.

Maximum elevations were increased to thirty degrees, with ranges over 30,000 yards. This is actually shooting around the corner of the earth at a target invisible from the firing ship. We have five ships that can do this, Japan, two, and England, one, with two building. At extreme ranges, therefore, we are again in the lead.

Before the Washington Conference it was an accepted principle that money available for building was better spent in new construction than in trying to keep old battleships up to date. With new construction stopped, however, this is no longer true, and there is a general desire on the part of the Navy to bring some of the old battleships up to date as far as possible.

Besides the conversion of coal burners into oil burners and the elevation of guns, which have been already discussed, the principal suggestions are the addition of "blisters" or outside bulges fitted to the hull as additional torpedo protection and an additional armored deck as protection against aircraft bombs. These are the items of reconstruction expressly permitted by the Washington Treaty. They are going to increase weight and decrease speed. When recommended by the general board we may be satisfied that they are desirable but their absence does not necessarily imply any inferiority as against ships of the same age in other navies.

The original plan of the Washington Conference called not only for the establishment of a ratio between capital ships but for the carrying of the same ratio down through cruisers, destroyers and submarines.

France, however, could not see the logic of this, and while assenting reluctantly to the capital ship ratio assigned her, claimed that the weaker navies should be entitled to an equality in cruisers and submarines. This Great Britain in turn refused to concede, so that no agreement whatever was reached as to the number of these ships to be maintained. The only limitation written into the treaty was that any new vessel displacing more than 10,000 tons or carrying heavier than 8-inch guns is a capital ship and this inferentially permitted cruisers up to that limit. Nobody considered building light cruisers that big, but, as usual in such cases, everybody now feels obliged to take full advantage of the permitted limit.

The United States has always been and is now deficient in light cruisers. When it was a question of where money should be spent there was good reason for this. A self-contained continental power has not the same need for cruisers as an island empire dependent upon oversea trade. Our chief concern is adequate scouting for the battle fleet, while other nations need this and protection for vital commerce as well.

Cruisers—With the construction of capital ships stopped, our deficiency in criusers begins to loom up and is taken more seriously. On the basis of straight tonnage it would take twenty-one of the new standard 10,000-ton cruisers to put us on an equality with Great Britain and Japan. If this number should now be built, however, it would give us a marked superiority—as all our cruisers would be modern and in large units.

The British and Japanese cruisers are of various ages; the British cruisers capable of making 29 knots or better dating back of 1914 and a great majority being between 3,000 and 5,000 tons in size.

Of modern cruisers of 7,000 tons and over we have ten of the *Omaha* class, Great Britain six and Japan four. Great Britain is laying down five more of the Washington standard size and Japan is laying down four. Against these our projected program of eight in the last naval bill would have been a satisfactory beginning.

Aircraft Carriers—At the time of the Washington Conference the only aircraft carriers afloat were a few experimental vessels converted from other types. If this had been a disarmament conference, as many people persist in regarding it, the obvious thing to have done would have been to forbid any construction of this kind. The sea powers involved, however, including ourselves, while willing to avoid expensive and ruinous competition had no idea of depriving themselves of a reasonable amount of naval strength. A limited tonnage on the 5-5-3 ratio was therefore permitted and provision was made for converting battle cruisers then building into this type of vessel. We are, accordingly, finishing up the *Lexington* and the *Saratoga* as aircraft carriers.

In the recent flood of criticism very little is heard about destroyers. The reason is that in this extremely useful type of

vessel the United States is far in the lead. We have 288 modern destroyers against 183 of Great Britain and sixty-five of Japan.

Great Britain has eighteen flotilla leaders, which are a sort of super-destroyer of some 1,800-ton displacement. They stand heavy weather better and have adequate accommodations for flotilla commanders and their staffs.

Submarines—Submarines are intended primarly for the defense of harbors and naval bases and to discourage transports trying to land invading forces upon a coast.

For such purposes the United States is stronger than either Great Britain or Japan. Submarines designed to accompany the battle fleet are still in the experimental stage in construction and the problematical stage in usefulness. Considering what was expected of destroyers when they got large enough to go out with the fleet we must not expect that fleet submarines will amount to anything more than another useful auxiliary arm.

Personnel—It is on this question of personnel that there has not been as much criticism as there should be. The Navy Department has been persistent in its demands for enough men to keep the fleet up to treaty strength but the "Little Navy" men in Congress have always forced a compromise. It is men that fight, not ships, and men that fight ships have to be trained to team work far above the standard of a college football team. It is only when some great disaster throws a lurid flash on their work that the public gets a glimpse of the constant and exacting drill that enables the Navy to get its unbelievable results in long-range shooting. Neither battleship, destroyer nor submarine personnel can be trained overnight.

At present we are allowed 86,000 enlisted men. Five-thirds of Japan's strength would be 97,100. Great Britain has 91,400 with a separate air service not counted in the Navy. There is usually controversy over these figures in Congress but these are recent and official.

Naval Bases—The resulting situation in the Pacific is that we have put such a vast stretch of water between our outposts and Japan's that neither nation can get at the other except by the slow process of seizing the strategetic points between. The all-important exception is that we have left the Philippines as a hostage within Japan's sphere, a consideration tempered by the reflection

that so far as inducing Congress to provide adequate defense they were probably that anyway. So of Guam, much prized of naval strategists, where the importance of establishing a first-class base was so far beyond the vision of Congress that we surrendered little more than a dream.

There can be no excuse, however, for not keeping our home bases adequate and efficient. It is needless to elaborate on the situation of San Francisco, where an unfortunate controversy has kept us from acquiring even the beginning of the necessities of a modern, full-sized fighting fleet. Some day these will be extemporized under tremendous pressure at tremendous cost.

Of even more importance is Hawaii, where no such extemporization is possible. Somehow the Navy has failed to bring home to the public how completely Pearl Harbor has been outgrown by the number and size of units of a modern navy. Either the south side of Oahu will have to be dredged into artificial harbors, utilizing Honolulu as well as Pearl Harbor, or the Navy will have to go to the north side of the island and take the coral out of the broad reaches of Kaneohe Bay. Today a fleet at war strength would have to rendezvous in quite a different place, of which it is sufficient to say that it is not fortified and not submarine proof.

Official Photograph, U. S. Navy

INSPECTION OF SCOUTING FLEET, HAMPTON ROADS

PROFESSIONAL NOTES

PREPARED BY

LIEUTENANT COMMANDER H. B. HIRD, U. S. NAVY

GENERAL ARRANGEMENT

VESSELS BUILDING	Great Britain	1519
NAVAL POLICY	France	1525
MATÉRIEL	Germany	1531
PERSONNEL	Japan	1535
	United States	1540
MERCHANT MARINE		1545
ENGINEERING		1547
AERONAUTICS		1560
ORDNANCE		1570
NAVIGATION AND RADIO		1578
MISCELLANEOUS		1581
CURRENT NAVAL AND PROFESSIONAL PAPERS		1592

GREAT BRITAIN

Australia Plans Construction of Two Big Cruisers

Baltimore *Sun*, 28 June, 1924.—Melbourne, Australia, June 27.—Prime Minister Bruce in an address before the House of Representatives today announced that the Australian Government proposes the construction of two 10,000-ton cruisers. He explained the project by saying that Australia's position is perilous now that Great Britain's naval power has been weakened.

Mr. Bruce asserted that the time might come when Great Britain would be compelled to defend itself at the expense of the safety of distant parts of the empire. He insisted that the Washington Treaty does not safeguard the world's peace as generally supposed.

The Prime Minister said that there was nothing in the treaty to prevent Japan from seizing the Philippines, although he did not suggest that Tokio contemplated such action, but he added that the fact remains that the treaty itself does not secure the peace of the Pacific.

"If Australia were not a part of the British Empire there would be a great incentive for any country to attack us," Mr. Bruce continued. "We have only to look around us to see the difficulties of other countries which, teeming with millions, realize our position."

Mr. Bruce said that the government does not propose to provide a Pacific base, as it is convinced of the importance of Singapore and considers that the British Government's decision to abandon that project may be reversed.

Thirty Members of Parliament Would Modify Program

London, June 27—Responding to the recent gesture from the United States, thirty Liberal members of Parliament, including Commander Ken-

Official Photograph, U. S. Navy
INSPECTION OF SCOUTING FLEET, HAMPTON ROADS

worthy and Captain Wedgewood, have signed a manifesto urging the British Government to modify its program from building five new cruisers. The manifesto has been prepared in view of the direct suggestion in the House of Representatives that the American naval program calling for eight cruisers be suspended in whole or in part until another international conference has been called to limit consideration of this type of war craft.

The Liberals hope to induce the MacDonald Ministry to diminish its naval program or else slow down on naval construction until after the American elections, when it is hoped that the prospective international limitation conference can be held.

Canadians Resent British Suggestion in Naval Affairs

By John R. Boone, Boston *Transcript*, 12 July, 1924.—Toronto, July 12. —Vice Admiral Sir Frederick Field, in command of the British Naval Squadron, at present visiting Canada, put his foot in it by certain remarks he made at Victoria, B. C., on what Canada should do in naval matters. "Tell him to mind his own business," said Mr. Roch Lanetot, when the incident came up in Parliament. This and equally heated remarks by partisans of the vice admiral's point of view illustrate the latent feeling that underlies the surface of this persistent and unsettled controversy.

Briefly Vice Admiral Field's contention is that Canada should have at least two cruisers on both Atlantic and Pacific coasts, if only for the selfish purpose of protecting her own ships and ports in time of war from depredations of such a ship as the *Emden;* also that these cruisers should be an integral part of the British Navy so that their personnel could look forward to achieving the higher commands.

Conservative papers allege that the discussion in Parliament was staged by the government. Andrew McMaster, a radical Liberal, made an inquiry, to which Hon. E. M. MacDonald, Minister of Defense, replied in part:

"The government did not invite Vice Admiral Field to make any such statement as is attributed to him. The well-recognized principle has always obtained that the question of how much shall be spent by the Canadian people on naval or other services is a matter which rests with the Canadian Government and Parliament alone. In the past there have been occasions, I believe, when the government of the day has seen fit to invite opinions from the authorities in the mother country with respect to naval matters. On this occasion there have been no requests for any such opinion or advice."

Apart from the issue of where advice comes from, concerning which the Minister of Defense seemed to be sensitive, the question remains as to why Canada as a matter of common sense should not have cruisers for the purpose the vice admiral mentioned.

The reply of those who are responsible for Canada's policy of splendid naval inaction would be, if pressed, two or three fold. They would deny, for example, that there is any sign of any naval conflict affecting Canada on the horizon. They would add that such being the case it would be foolish for Canada, burdened with war debt, to spend money on the luxury of cruisers. Such extravagances are only for nations rolling in wealth like the United States.

Moreover, if war did come, and it was necessary to protect Canadian grain on the way to market—the point that Vice Admiral Field stressed—it would obviously be as much the need of the party receiving the grain as of Canada to protect it in transit. The Canadian farmer could probably do without his money more easily that the purchaser could do without the grain.

Canadian opponents of empire naval participation have always affirmed that nothing like sufficient credit has been given Canada for her expenditures on transcontinental railway transport. These railways are as much the link of defense, both for grain transport and other purposes, as ships at sea, and into railways Canada has poured money like water, not primarily for defense, though defense has been a secondary result.

The two burning points in the question of a Canadian navy are money and control. On the money point Canada's present attitude is that having spent hundreds of millions on railways, she has no money to spend on warships. On the control point, Canada's position is that pending the setting up of satisfactory machinery for a unified empire control. Canada alone must be responsible for any naval enterprise that she may inaugurate and pay for. Hence the minister's touchiness when the vice admiral tendered advice.

Mr. MacDonald's curt statement has stirred up a hornets' nest of criticism. The Toronto *Mail and Empire* says: "The twisting of the lion's tail, now obsolete elsewhere, is for some reason, deemed good policy by the present government of Canada.

"Of course, there are enemies of Britain in Canada; there are Bolshevists here, but these are negligible. If the government of Canada desires to humor them then the government of Canada is consistent in meanly nagging a gallant British admiral and in showing ridiculous truculence to Britain. It is a stout upholder of freedom of speech when the speaker is an assailant of Britain. . . .

"This aping of a certain type of United States politicians who cultivate hatred of Britain is as odious to the Canadian people as is possible for the conduct of a Canadian Government to be, and the consequences of it will recoil upon Premier King.

"It is a striking commentary on the attitude of certain Liberal members toward national defense that in every other Dominion where Sir Frederick Field spoke he was praised for his fearlessness, his candor and helpful advice on naval matters."

Ironically, the Montreal *Star* says a creditable sign to put at the entrance of every Canadian port would be: "Everybody welcome except the British Navy." This paper also observes:

"The threat of danger has always speeded up the naval preparations—always far in advance of ours—of New Zealand and Australia. There is only one reason why that same threat of danger does not loom with as much menace over us; and that is because the American Navy as well as the British stands ready to defend us against any such attack. We are fortunate in this but we are hardly a pauper nation. Some day we shall feel that a people who depend absolutely upon others for their safety, do not truly constitute a nation at all, but a charity ward, who may pester other people into 'recognizing' them but who fall far short of that general respect which men who pay their way always command."

Launch of H.M.S. "Adventure"

The Engineer, 20 June, 1924.—On Wednesday, H.M.S. *Adventure* was launched at Devonport Dockyard. The naming ceremony was performed by Lady Chelmsford, wife of the First Lord of the Admiralty. This vessel, a cruiser-minelayer, was the first man-of-war of any considerable dimensions to be laid down for the British Navy subsequent to the conclusion of peace. Her keel was laid on November 29, 1922, so she has been on the slip rather more than eighteen months. Like all the British warships built during and immediately after the war, the *Adventure* was designed by Sir E. T. d'Eyncourt. She is the first minelayer to be built as such for the Royal Navy, all the other vessels of this class having been converted to

their present duty. While official details are still withheld, a service paper states that the displacement will be about 7,000 tons. A sum of £404,347 had been spent on the ship up to the end of the last financial year, while a further £323,236 is to be disbursed under the current Navy Estimates. Of this sum, £112,000 goes for labor and £98,400 for contract work. With the *Adventure* afloat, preparations are being made for laying down on the same slip the new light cruiser *Cornwall*, one of the five new cruisers authorized this year as part of the Admiralty's replacement program. With the launch of the *Adventure*, there is now only one vessel of war actually under construction in this country—the submarine *O-1*, recently laid down at Chatham. This state of affairs, we believe, is without precedent in the modern history of the British Navy. Orders for the two torpedoboat destroyers for which provision is made in the current year's Navy Estimates have now been placed with John I. Thornycroft and Company, Limited, of Scotston, Glasgow. The total expenditure on these new vessels during the current financial year is £147,848.

New Cruisers' Machinery

Naval and Military Record, 28 June, 1924.—The placing of contracts with five private firms for the construction of the machinery for the cruisers to be laid down during the current financial year does not necessarily mean that the Admiralty are not sympathetic to the idea that the royal dockyards should undertake this work. The real purpose in view is to spread the work as widely as possible so as to minimize unemployment, and as the royal dockyards are getting three out of the five hulls to construct they have no reason to be dissatisfied. Both at Portsmouth and Devonport work has recently been given out of a character which suggests that the Admiralty have in mind the possibility of restoring engine and boiler-building in these establishments.

It is a very debatable point as to whether the policy of letting the royal dockyards construct warship machinery would be a wise one. The necessity to provide a steady continuity of work so as to maintain these organizations permanently at an adequate standard of efficiency is, of course, a strong argument in favor of the principle. On the other hand, it is a matter of national importance also to maintain the private armament establishments (the "splendid national asset," as Lord Selborne called them) to the extent of being able to count upon their immediate co-operation in the event of war. The private establishments are going concerns for turning out engines and boilers. A heavy expenditure on plant and shops would be necessary to enable the government yards to undertake such work. Probably the present compromise is the best plan—to let the royal dockyards build the hulls, which they are so well able to do as now equipped, and let the armor, armament, machinery and boilers be turned out by private contract.

Blood Thicker Than Water

Naval and Military Record, 2 July, 1924.—It was in Chinese waters that the American naval officer, Patnall, gave utterance to the famous dictum that blood is thicker than water as he proceeded to the assistance of the sorely-pressed British, and, fittingly enough, it is in Chinese waters that once again we see the material expression of this sentiment. Mr. Hawley, the American manager of Messrs. Arnold and Company, of Shanghai, having been murdered by junk-men at Wan-hsien, the British river gunboat *Cockchafer* proceeded to the spot as rapidly as steam could drive her and as she went she cleared for action, for Lieutenant Commander Ivan Whitehorn was his own senior officer; he knew exactly what he meant to do, and he did it.

Anchoring in a berth commanding the town, the guns of the *Cockchafer* were trained upon the place. Lieutenant Commander Whitehorn then demanded that the leading military officials of Wan-hsien should follow on foot in the funeral procession of the murdered American, and that the two junk-men concerned in the crime should be executed on the spot. The last named condition was promptly and cheerfully acquiesced in; the former was a very different matter. Had rickshaws or palanquins been permitted it would not have been so bad, but to have to trudge after the remains of a foreign devil man—shades of mandarism! Lieutenant Commander Whitehorn did not argue. He simply said, "Very well, then" in a voice of finality, and so that the exalted officials walked, and our prestige has gone up several notches among the Chinese, who both understand and admire this sort of treatment. Lord Nelson said that a British warship is the best negotiator in Europe, as she always speaks to be understood. To this we may add China.

Curiously enough, at the same time that the account of the doings of the *Cockchafer* were published in this country there arrived news which more than justified the action of Lieutenant Commander Whitehorn—had justification been necessary. It has often been asked why our river gunboats in China are employed on duties which should be carried out by the Chinese Navy. The answer is that the Chinese Navy either cannot or will not do the work which ought to form an elementary obligation of its rôle. The Chinese pirates perfectly well realize this, and the result is that they regard the Celestial Fleet as a big joke.

It is true that they made a mistake in the case to which we are now referring, but this was due to accident rather than to the efficiency of the Chinese Navy. Thirty-three pirates had come to the unanimous conclusion that the *Haichi*, the biggest cruiser which China now possesses, would be a very useful vessel for their work, and so they decided to capture her as she lay off Chefoo. They chose a holiday for the attempt, when they calculated that the bulk of the crew would be ashore, but it turned out that the commander was displeased over something and had refused leave. The attack was duly delivered, but under the grievance of leave-stopping the cruiser's crew were in good fighting trim. The police ashore got nine of the pirates, but the rest escaped. The point of the thing is that such an attack upon a big warship should be deemed not only possible but easy. Clearly, for the sake of the peaceable Chinese, it is as well that our river flotillas should continue to show their flags in the Back of Beyond.

Destroyer Building

Naval and Military Record, 2 July, 1924.—Contracts for the two destroyers to be built under the current Navy Estimates have now been given out. The *Amazon* is to be constructed by Thornycroft of Southampton, and the *Ambuscade* by Yarrow on the Clyde. As the royal dockyards are getting three of the five new cruisers, they will doubtless regard with equanimity this allegation to private yards. In any case the Admiralty are merely following what has become an established principle. It is only under exceptional conditions that destroyer construction is given to one of the royal dockyards, and Pembroke or Chatham have been the establishments selected for the purpose of late years, when it was essential to find something for these places to do in order to keep them going.

While destroyer-building does not vary much in essentials from other warship construction, it is true to say that there are advantages in confining it to firms which have specialized in it. Through long experience these firms have evolved distinctive features of their own, so that it has become a custom in the service to speak of "a Yarrow boat" or "a Thornycroft boat"; nor, as a rule, do the private firms which specialize in destroyer

building tender for any other class of warship construction, with the possible exception of submarines. At the end of the war a number of destroyers were on the slips, and some of these were sent to the royal dockyards to be completed, as an alternative to scrapping them altogether. But, as the chief purpose of the Admiralty in connection with dockyard shipbuilding is to provide continuity of employment for the maximum number of men possible, they naturally prefer to give these establishments big ships to rear.

Relative Destroyer Strength

Army, Navy and Air Force Gazette, 14 June, 1924.—On the basis that the useful life of a destroyer is twelve years and that in the case of British destroyers one year's war service is equal to two years' peace service, the destroyer strengths on June 4, 1924, are: British Empire, 197; United States of America, 279; Japan, 74. On the assumption that existing programs authorized and projected will be completed, and taking no account of possible future programs, the destroyer strengths on April 1, 1929, will be: British Empire, 119; United States of America, 262; Japan, 82. The formula that one year's war service was equal to two years' peace service was applied in the case of British destroyers. We are unable to answer for other countries. No other navy did the same service as our navy during the war—not the same amount of comparable service.—(Navy Parliamentary Secretary).

A Word of Warning

Naval and Military Record, 25 June, 1924.—Rear Admiral Baird delivered some plain, simple truths during the course of a luncheon given by the Lord Mayor of Liverpool to the officers of the first and sixth destroyer flotillas on the occasion of their recent visit to that port. He chose for his text a theme which should have a very direct appeal to the people of the Merseyside—the protection of our sea-borne commerce in wartime. If we lacked a sufficiency of light cruisers and other craft suitable to maintaining control of the ocean highways, there will be very little help for us. The Admiral drove home his point by figures. He pointed out that the regular ocean routes traversed by the British Mercantile Marine total 80,000 miles, and that at any hour or day of the year there are at least 1,000 ships of the Red Ensign coming and going upon those routes.

Admiral Baird's references to the reduction of our naval personnel must have set his hearers pondering. Two years ago, he said, our man-power was "cut to the bone." There has been a slight reaction since, but we are merely compromising with necessity. The more highly trained and efficient a personnel is the more difficult it is to replace. Admiral Baird paid a well-merited tribute to the admirable reserve which is supplied by the Mercantile Marine, but his words amounted to a warning. To say that there is no visible prospect of a great war is to dangerously beg the question, for, to be logical, the natural sequence to such a premise is the abolition of the navy altogether. The only true doctrine for the assurance of national safety is that laid down by Oliver Cromwell: "Put your trust in Providence—but keep your powder dry." The pacifists have very short memories. They forget that only a few years ago they were murmuring "Thank God, and the British Navy, for our daily bread!"

U. S. Senate and Washington Pact

Naval and Military Record, 18 June, 1924.—On the presentation of a bill for the modernization (the word is used in the bill) of the United States battleships of inferior fighting value, the Senate passed it "without a word

of debate." It is true that subsequently Senator King moved for a reconsideration of the bill and thereby delayed its passage, but the real interest of the proposal lies in the fact that they should have been presented to the Senate at all. Even more significant is the circumstance that they were drafted by the Navy Department. Now, "modernization" may mean anything. But the only justification which presumably a shrewd body of men could find for voting a big "appropriation" would be that the money spent should result in a substantial improvement in the fighting value of the ships.

We here get upon very delicate ground. It is not many months ago since Mr. Denby, the then Secretary to the Navy, made a deliberate accusation of a breach of the Washington Agreement against the British Government, in that he alleged that the angle of turret gun elevation had been increased in certain of our battleships. A refutation was promptly forthcoming, but the incident is not forgotten. American politics are often very devious in their methods. The declared doctrine of the present Navy Secretary is to build up such a naval force, "to bargain with," that the other Powers will consent to any fresh limitation America may dictate. He may possibly conceive that the Washington Agreement might be worthily waived in such a good cause. None of the great naval Powers would object. They would then be free to return to independent judgment of the needs of their own particular interests.

The British Empire

Current History Magazine, July, 1924.—When questioned in the House of Commons, Prime Minister MacDonald again refused to make the charge that in modernizing its fleet the United States was defeating the purposes of the naval treaty. *The British Naval and Military Record* points out that Great Britain should be careful about making charges concerning modernization, as the battle cruiser *Renown* has been under modernization for the best part of a year and similar work is contemplated by the Admiralty on other vessels.

FRANCE

France Makes Ready for Aerial Warfare

By Georges Lechartier, Baltimore *Sun*, 21 June, 1924.—Paris, May 28.—Before it adjourned on the eve of the general election, the French Chamber of Deputies adopted the Air Force Bill.

This bill, it is almost useless to say, is entirely inspired by the declaration of Marshall Foch; "The main feature of the next war and the one that is to make it most unlike any previous war is the considerable part which the air force will play in it." The new air bill provides for a material increase, a better organization and a greater efficiency of the present air force in France.

This air force will be composed of 208 squadrons, instead of 132 that it counts today. The squadrons are to be assembled in eighteen regiments of four or five companies. Military Zeppelins and dirigibles for the services of information will require nine companies. These various units form several brigades and two divisions. The total air force will count 3,150 units of all types, instead of 2,000 that it now possesses; 35,000 privates and non-commissioned officers and 2,000 officers will form the effective force. Because of the considerable expenses foreseen for the purchase and fitting up of the grounds in various parts of France and of her colonies, for the buildings and sheds, for the construction of the units and the training of the men, this plan, which caused so much disquietude and comment in Great Britain, is not scheduled to become effective before the year 1929.

The great novelty of the report on the bill is the complete separation it establishes between military and commercial aeronautics. Up to these last months it was almost unanimously admitted in all military and technical services that commercial aviation was and should remain in peace time a camouflaged military operation for use in time of war.

All French air officials agreed that transportation by air offered the best means for training and keeping fit a few hundred pilots and for stocking an important reserve of war machines.

Some sensible reconsiderations, stipulated in the last report and upheld by the Minister of Air, M. Laurent Eynac, fortunately persuaded the authors of the bill altogether to abandon these views.

It was pointed out that, besides giving new strength to the old propaganda against militarism, this bellicose demonstration would prove as morally dangerous as practically futile. In fact, only a little more than 200 machines are in service in the commercial companies of air transportation and would thus constitute a reserve not even equal to one in ten—i. e., ridiculously inadequate.

But the statement which most impressed the officials and deputies was that, since commercial and military aviation have entirely different and almost irreconcilable aims, it should be admitted that their characteristics both in construction and in equipment must differ radically.

The report established clearly that the main objective of commercial aviation is to make the enterprise succeed commercially—i. e., to lure the greatest possible number of passengers with the most considerable quantity of goods to take to the air in preference to railroads or steamship lines, and this at a minimum expense to the air companies. Commercial machines should therefore be economical in fuel consumption, safe and comfortable. Their speed should be limited by consideration of the cost of oil to about 100 miles an hour.

War machines, on the contrary, must be ready at any cost for swift and exacting military service. Therefore they must be strong, fast, capable of rapid ascensions and provided with powerful motors normally used at their maximum of power regardless of fuel consumption. Comfort is naturally reduced to the minimum or entirely neglected.

Of course commercial machines will have an important part to play during the war, but they will be kept for service behind the lines. They must insure rapid transportation and carry orders at all points on the first days of mobilization and they must be ready for use at all times by headquarters and staff officers to maintain contact between the different units. In brief, commercial airplanes and dirigibles in war time will more efficiently render the same kinds of service as did the private cars, taxis, auto-busses, yachts and merchant ships during the recent war.

I had quite recently an exceptional opportunity to discuss this plan and the possibilities it contains for self-protection and war defense with a high official of the technical service of aeronautics while we were both watching one of the reviews of the air force, which are now regularly offered as most impressive shows to sovereigns who come, one after another, on official visits to France. As we were pacing to and fro along the concrete terrace which dominates the immense aviation field of "Le Bourget," squadron after squadron of airplanes, each composed of eight fine grey birds uniformly decorated with the three colored circles upon their wings, took their departure every two minutes, all "ungluing" simultaneously, then circling in perfect ease and straight alignment to "take the height," and finally darting eastward to their respective positions for the formal review.

My companion, emphasizing the importance and the necessity as a means of defense of the foreseen development of French aviation, quoted, in support of his statement, a recent article by an American army officer in

an American periodical (the *Atlantic Monthly* for February), which said in substance:

The very nature of the air force makes it the perfect instrument of diplomatic pressure, as well as the ideal weapon of war. It is a fact that, thanks to the development of aëronautics, war has already changed its character, and instead of being an affair of "fronts" the next war will become an affair of "space." The increase of length of flight, of carrying capacity, of the speed and of the general efficiency of the airplane, if the increase of the number of units and of potential production be added to it, implies that whole fleets of machines will be ready to take the offensive as soon as war is declared. Each of the combatants will immediately strike the heart and the nerve centers of his adversary—i. e., dock yards, factories of ammunition, public offices and buildings—in brief, all points essential to the morale of the country.

"Brigadier General Groves," pursued my companion, "recalls impressive facts and the numerous and conclusive experiments which, since the Armistice, have established the supremacy of the air force as the instrument of future war, and he concludes that as long as force of arms remains the dominating factor in human affairs the nation best provided with airplanes will be and already is the one to dictate her will to the others. No surer truth can be affirmed, and this is exactly the principle which inspires our aviation; but General Groves overlooks one fact that would make his vision of the next mobilization, while still perfectly exact, more frightful than he describes it. The next war will not be a war of destruction of factories and buildings, a war of bombs and shrapnel. The next war will be. . . ."

At this moment he stopped, stretched his hand westward to the sky where a wonderful spectacle was fast approaching. Line after line of airplanes seemed to rise from the horizon and come toward us. Soon they passed just over our heads, in the V formation, the angle of each V being exactly as open as the one of the preceding line, each of the seven units composing the two branches of the V keeping exactly the same distance from its neighbor, all at the same height and as uniform in speed as cars bound together in a train.

The sky was literally spotted with machines. More than 100 were visible at the same time. If it had not been for the deafening noise of the motors one could have believed that he was the subject of some optical delusion as successive lines of airplanes appeared and passed with a synchronized regularity and identical motion. Whatever it was, militaristic parade, achievement in air training or war demonstration, it was indeed a grand sight.

Resuming his former explanation, my companion continued with the same quiet tone, as though we had not just been witnessing one of the most thrilling shows that can be seen:

"Supposing that each of these units carries instead of machine guns and melinite bombs, as they did during the last war, a few cylinders of . . . of neither phosgene, nor methylchloroformate, nor yellow-cross, nor yperite, nor diphenychlorasine. nor ethyldichloarsine—all these gases had their day—but a few cylinders ot the new substances which the big German factories of Hochst and Leverkusen are said to be capable of producing by the ton in a few hours' time and merely from chemicals which they actually manufacture by thousands of tons monthly for the use of agriculture and of the dye industries. I mean the substances which no allied control can detect in advance, which no League of Nations can forbid, which no treaty can stop—the substances of which a few gallons would suffice to extinguish all life in an area as wide as a district of London in less than three minutes' time. Supposing that this regiment of airplanes which we just reviewed is able to resist all kinds of protecting 'death rays'—which, by the way, seem yet to be discovered—and supposing it flies over

some big enemy city and drops its cargo of the new substance. Now, do you begin to realize what the next chemical-and-air war can be and why we must develop our air force by all means?"

"Of course, this is only supposition," said, I, "and who, in cold blood and common sense, can talk now of the next war?"

"The American Secretary of the Navy was right when he spoke before the recent congress of merchant shippers about pusillanimous pacifism. Curtis Wilbur was more right when he said that we must be prepared against war, and we can be prepared against war, only if we prepare for war," was his answer.

Pre-war Theme and Pre-war Weapons: New Strategic Conditions in the Middle Sea and the North

By F. B. Gautreau, *Naval and Military Record*, 25 June, 1924.—A third Minister of Marine has entered Rue Royale since January 1, last, in the person of M. Dumesnil, and there will be surprise if a fourth and even a fifth does not step into his shoes within the next few months, the present Chamber being unmanageable, and the weak Herriot Cabinet being likely to make room shortly for a stronger Briand Ministry. Minister Dumesnil has not a good press, but this does not mean much, and he may do good things for the navy, especially as he happens to be an aerial specialist of note, and the naval wing sadly wants strengthening.

Political events have, happily, little influence on naval training, which is being steadily pursued both in the Mediterranean and in the Atlantic. Brittany waters are, as usual, a favorite battlefield with our admirals, especially Guiberon Bay, to which great strategic importance has been attached at all times, and so, in those dangerous parts of the Bay of Biscay that are yet marked by the great, sinister-looking wreck of the battleship *France* (sunk two years since in night maneuvers), Admiral Zehenne, *"Commandant en chef du Front de mer de l'Atlantique,"* having under his command the Lorient garrison, no end of mobile and fixed batteries, submarine and aerial flotillas (in charge of Admiral de Cransac), has been for the last week keenly at work, repelling the attacks and outwitting the clever feints of Rear Admiral Docteur, *Chief de la Division de la Manche* (that nominally includes the *Voltaire, Diderot, and Condorcet*), who has at this disposal two or three large units (including the *croiseur-cuirassé Jeanne d' Arc*), a dozen destroyers, and as many submarines, besides seaplanes.

It is a fine game of chess between experienced admirals well acquainted with the peculiarities and possibilities of the Brittany Coast, and extremely interesting from a spectacular and sporting standpoint. Bombardment and landings make up the whole theme; in this respect no progress has been made since 1914, and no account is being taken of the tremendous aerial and ballistic developments resulting from the war. It is nothing more than a pre-war theme carried out with pre-war weapons, at least, in its essential part, for it is the intention of the supreme command merely to try to see what influence a combined aero-submarine force, based on Lorient and Quiberon, could exercise on the command of the Bay of Biscay and of the Channel-Gibraltar route. The cruiser *Jeanne d'Arc* would play the rôle of a fast enemy cruiser force to be "shadowed" from the air by light seaplanes, permanently located and then waylaid by submarines and seaplanes, either from Brest or from Rochefort, when not from both simultaneously.

This will mean a return to the sound doctrine of offensive *à outrance*, that is necessary to enable the French Navy to attain its maximum of efficiency. If the French Navy were to be content with a purely defensive attitude and with waiting quietly for enemy attacks along a 3,000 kilometer

coast line, it would have little weight in the balance of sea power and might be considered as negligible quantity in the settlement of world problems. On the contrary, should a bold offensive spirit animate the French High Command and utilize to the full the strategic assets in the hands of France (that are only second to those possessed by Great Britain), then France, despite her diminutive battleship force, remains a first-class naval power, strong enough to have a say in every sea and to play a determining rôle in any conflict. Given active aerial and submarine flotillas under the Tricolor, France more or less (more rather than less) commands all European sea routes.

In the Middle Sea, for instance, Admiral Dumesnil (who is the ex-lion-hearted commander of the Latouche-Treville) has under his orders a ridiculous force; viz., nominally six old patched-up ships of 23,500 tons with inferior flotilla auxiliaries. He would not exist in an artillery duel with either the British or American Armadas, but the game is seen to change totally when the admiral brings to the rescue his unique strategic assets; viz., the seaplane flotillas of St. Raphael, Corsica, Bizerta, Algiers, and Oran, with their *avions-torpilleurs*, and mining and torpedo flotillas, expert in the art of camouflage and deadly ambushes. With the coasts of Algeria and Corsica organized offensively as they ought to be, and with those of Italy, Sicily, and Sardinia in similar conditions (which is now being done by Imperatore Mussolini), the western Mediterranean is being transformed into a "no man's land" so far as large surface ships are concerned. Great Britain alone commands the entrance, and three Powers (France, Italy, and Britain) control the central gate.

Similarly, the granite promontory of Brittany, with its innumerable bays and shelters and islands suitable for long-range batteries or seaplane watch-stations, is so placed as to divide the most important sea routes of Europe, and, under the new conditions of warfare, to control them all, provided, of course, Brittany flotillas possess range power, without which all strategic assets are wasted. With seaplane and underwater flotillas trained to work a few hundred miles at sea and in a position to place any enemy under close watch as soon as war has been declared or has become unavoidable, French Atlantic coasts have nothing to fear from either landing or bombardment, though, of course, there will always remain the possibility of enemy submarines suddenly emerging at a shot distance and shelling a port, especially St. Vazaire. Against the latter danger precautions have been taken, and raids of that sort might prove unhealthy to large German submarines, that would be operating in difficult waters studded with submerged rocks and granite ridges and needles. The seaplane of medium size, well in hand, and thoroughly reliable (such as the *Breguet*), is more and more seen to be the most efficient instrument of coastal warfare: it brings instantly the solution to all tactical and strategic problems.

Under the new "Light Program," the navy is to construct two experimental *croiseurs-sousmarins* of 3,000 tons. Tenders have been invited from all the great shipbuilding firms, and it is specified that that firm will get the orders that will supply plans most satisfactory to the Admiralty. It was that very method of applying to all available talent twenty-five years since that was responsible for the birth of the epoch-making *Naval* (Laubeuf design), first of all submersibles that for a time assured French underwater supremacy. Simmonat, Laubeuf, and all our most reputed designers have joined in the fray, and the results of the competition will be awaited with interest, although Admiralty engineers have, of course, advantages in the contest from being favored with data withheld from civilian competitors.

The 1,900-ton submarine *Halbronn* (ex-German *139*), our largest underwater craft, has left Northern waters for an experimental cruise on the

coasts of Morocco and Algeria. She has received many modifications tending to better habitability. Her torpedo-armament has been strengthened, she has retained only one gun forward (instead of two) and although her speed is only 15 knots, she is a good instrument of high sea warfare, her radius of action being considerable, with nearly 400 tons of oil fuel on board.

The ill-fated target ship *Vergniaud* (1,800 tons) has once more been sunk by sandfilled, armor-piercing shells from the *A.T.-10* dirigible off Toulon, which experiment shows the practicable impossibility of adequately protecting armor decks against high velocity shells, and serves to foster the buoyant hopes of aerial enthusiasts, who keep asserting the battleship is a thing of the past—contentions which the *Académie de Marine,* under Admiral Brarieus, persists in solemnly refuting and condemning.

Defensive Themes in French Maneuvers

By F. B. Gautreau, *Naval and Military Record,* 2 July, 1924.—Premier Herriot is a sincere partisan of disarmament, of peace and kissing all round, and the misfortune is that he should "boss the show" in Paris instead of in Berlin. He would like France to give once more the example in the direction of disarmament, and has promised to curtail naval and military expenditure at once, but General Nollet would like Germany to commence first, and M. Dumesnil, minister of marine, who is tackling his job in earnest, witnessing gun and bombing practice in Toulon, is finding that the fleet is short of a lot of necessary things.

Once more *grandes manœuvres navales* have taken place off Brittany in the good old style. The enemy, located just in time, was attacked and defeated by superior force in conformity with the best notions of the game, and, therefore, the glorious Tricolor flies supreme and unchallenged over the stormy waters of the Bay of Biscay—until next time. Two years ago exercises on a similar scale were made to appear in a certain portion of the British press, unacquainted with ships, as an intolerable manifestation of French naval imperialism and as a menace to the integrity of the British command of the sea. No naval scare need this time be raised out of those so-called maneuvres, for the "imperialistic" navy of France only mobilized two old obsolete surface ships: viz., the 18,000-ton *Diderot* and the 11,400-ton *croiseur cruirassé, Jeanne d'Arc* (used as cadetship), plus two dozen auxiliaries and half a dozen admirals. Indeed, the human element was decidedly the most formidable asset in the recent naval display.

A sign of the times is the fact that the theme was of a purely defensive character. The times are no more when three French battle fleets could meet in the Atlantic to study in a realistic manner that momentous and traditional problem, resulting from French geographical position: viz., the junction of the Toulon and Brest fleets in the presence of an enemy fleet—the problem that was tried and could not be solved before Trafalgar, the problem that saddles France with inferiority both against Great Britain and against Italy. The downfall of the "imperialistic" navy of France is such that that very problem no longer exists for the French Navy of today, that keeps all her battleworthy ships in the Mediterranean, a mere shadow of her pre-war strength, and no longer needs to trouble about the Gibraltar Rock. In reality, scientific evolution has changed the problem of concentration of the French fleet. It is admitted that the Gibraltar Straits (and, as a matter of fact, all straits) will be dangerous gauntlets to force for large surface ships. The Gibraltar Rock, with its torpedo and aerial flotillas, enabling the approach of an enemy to be detected hundreds of miles off, must be said to close effectively, and far more effectively than in the past, the Mediterranean, so far as surface ships are concerned. Only with the permission of Great Britain

could the Italian and French Middle Sea forces make their exit into the Atlantic.

At the same time, the Gibraltar stronghold can do little to stop aerial or submarine craft. Experiments by Commandant Teste have shown that seaplanes can easily pass from the Atlantic into the Middle Sea by utilizing the Canal du Midi and Garonne waterways. The same route could also be used by small submarines. Moreover, new type seaplanes can indifferently alight on water or firm ground. These exceptional facilities for concentration against any enemy, either on land or on sea, and at a few hours' notice, are a weighty asset on the side of the aerial weapons.

The theme of the Brittany maneuvers, though defensive, was interesting, and would have led to sensational developments had the actors in the naval game been more numerous and more up-to-date. Too much conventional and make-believe, moreover, robbed the exercises of much of their potential value. A false idea of modern warfare is apt to be derived from the use of obsolete weapons. The initial defeats of the heroic French infantry regiments at Charleroi (when, regardless of losses, furious attacks *à la baionette* were repeated against the well-entrenched Germans) were due, said General Fonville, to the persevering practice of errors during peace maneuvers. Now it looks as if a mistake of a similar order were being made by the French authorities, not through any lack of competence, but rather owing to the want of modern units, and also to the desire of the Paris Government to spend the least possible on fleet training. Next year, however, the completion of the units in hand will enable problems of Atlantic strategy to be studied with thoroughly up-to-date weapons. . . .

Recent American discoveries that, despite the Washington agreement, the American Fleet remains vastly inferior to the British Armada in the matter of fighting value and all-round quality, have caused some amusement among French naval men, who do not forget the high-handed way in which America, under the pretext of squaring little difficulties with Japan, assigned in the naval hierarchy humiliating rank to the ancient and glorious navy of France. Financial supremacy is on the side of America. That is much, but it is not everything in the making of sea power: the sea spirit and great sea traditions count for more, and without minimizing the fine records of the young American Navy, she cannot compete with Britain in those respects. Size in ships is not everything: range and speed count for more, and the 27,000-ton *Warspites* and even the smaller *Royal Sovereigns*, are better and more up-to-date *instrumente de combat* than the 33,000-ton *Pennsylvania* and *Colorados*, while no counterpart is to be found in the American Fleet to the mighty *Hood*, *Renown*, and *Repulse*, that stand unchallenged in the ocean. Progress in armament and tactics has also for the present its home in England, that enjoys, moreover, an enormous strategic superiority over the great American Navy.

GERMANY

Hunt for German Arms Called Unnecessary

By S. Miles Bouton, Baltimore *Sun*, 15 July, 1924.—Berlin, June 26.—Does France, even the France of Herriot, really want to reach an understanding with Germany? Does she really want reparations? Is her fear of an attack by Germany genuine? Do her 750,000 soldiers, 164,000 of them on German soil, really shake in their boots when they think of Germany's 100,000 Reichswehr men, without heavy artillery, without gas masks, with insufficient ammunition and stores?

Did France and Belgium, when they accepted Dawes plan as an "indivisible whole," mean what they said? And if not, what explanation is there for these last speeches of Herriot, for Theunis' interview in *Le Matin*?

And what of Ramsay MacDonald, leader of a democratic Labor party? Is he blind to the effect which these new demands of France and Belgium regarding the evacuation of the Ruhr and the restoration of Germany's economic unity have in Germany, even among those Germans whose political belief is akin to his? Has he not observed that even Breitscheid, the former Independent Socialist and internationalist, tells the editor of the Paris *Œuvre* that the latest demand for another investigation of German armaments through the Interallied Military Control Commission was not merely unnecessary but that it implied moreover a severe humiliation for the whole German people?

These are the questions which even the Germans of the political Left are asking these days. They are the questions which—less precisely formulated, but in effect the same—are being asked of me every day by the little mechanic next door to my office, who used to be a Socialist but now has his doubts; and they are the questions that move the press of the Right to headline their comments: "Poincaré Overtrumped."

When King Gustavus Adolphus of Sweden landed in Germany to participate in the Thirty Years' War, he issued proclamations setting forth his upright motives and purposes. Wallenstein, the rude soldier of the Holy Roman Empire, was not impressed. "I watch the enemy's fist, not his mouth," he said. Through all the talk of these last days about "moral pacts" and "democratic policies" more and more Germans are beginning to see fists.

As this is written the German Cabinet is meeting to formulate its answer to the demand for another control inspection. It will submit, for purely foreign-political reasons, despite the fact that when the last inspection was made it was promised that that should be the last; thereafter the League of Nations, in accordance with the provisions of the Treaty of Versailles, was to take over the control.

The Cabinet's hesitation is not due to any fear as to what a new inspection could discover. Its members know, as every intelligent man here knows, that Germany is disarmed, that she could not, unaided, carry on a war even against Czecho-Slovakia; but they resent this new and unnecessary humiliation, and they fear that the coming control visits may not always pass off quietly; and every stone thrown by some irresponsible hothead at a control commission's automobile, every open demonstration of hostility to former enemy officers, means more humiliations for Germany, endangers further her chance for ever seeing real peace again.

General Allen wrote in his diary on April 29, 1922, that Colonel Cox, arriving at Coblenz from Berlin, had informed him that General Nollet, head of the control commission, had admitted that Germany has disarmed, but had said that even insignificant discoveries of arms still had to be played up for political reasons. A month earlier General Allen had noted that General Bingham, head of the English Department of the commission, had assured him that Germany was actually disarmed, and that Nollet was of the same opinion.

Great quantities of further testimony along the same lines could be adduced, but it is not required; there is one factor here which alone makes it utterly impossible that stores or arms or other munitions of any consequence whatever can still be hidden in Germany. This factor was referred to—but plainly without any realization of the inescapable deductions to be drawn from it—in a report made by the French members of the commission.

The Germans, said this report, were "simply wonderful informers." Everywhere the commission has been overwhelmed with information, some of it offered in the hope of payment, some by pacifists following their principles, and still others by disgruntled Germans who hated their government and country.

This has been so ever since the Armistice was signed. There is not a corner in Germany that does not harbor Germans who are eagerly thirsting to tell the control commission where every fowling-piece and rusty sword is their district is to be found. Whoever asserts today his belief that Germany is not disarmed documents thereby not merely his ignorance of conditions here, but also his ignorance of the postrevolution mentality of a great portion of the people.

The German Government bears none of the responsibility for the fact that the control visits were not carried out in 1923. Following the invasion of the Ruhr, it informed the control commission that any inspection by French or Belgium officers would undoubtedly lead to serious conflicts, and that it could not guarantee their safety, but that there was no reason why the British and Italian officers should not continue their visits. General Nollet, however, ordered all visits stopped.

Little is known abroad—little is known even generally in Germany—of what the activities of the control commission have meant for Germany in these last years. The commission went repeatedly far beyond its powers, violated in many respects the Versailles Treaty, and combined with this many chicaneries whose effect, if not purpose, was to cripple Germany economically. Here are some of the crasser examples:

The Spandau works, manufacturing ammunition and implements of warfare, were converted for peace purposes after the war. Here, as in all other similar factories, all stocks of war materials and all machinery for making them were destroyed. In addition to this, Nollet refused to permit the reorganized works:

To replace an antiquated rolling mill, manufacturing bar iron, with a more modern one;

To replace a small, defective open-hearth furnace by a larger one;

To install a machine for making screws for the requirements of all allied *Deutsche Werke*, as the reorganized plants of this kind are known;

To remove a Bessemer furnace from a factory where it was not needed to another where it was needed.

In Erfurt Nollet prohibited a factory from manufacturing so-called Tesching pistols, using .22-caliber short cartridges. In the former powder factory of the same works he compelled the destruction of the boiler because this had been "used indirectly in making explosives."

The manufacture and use of gas masks by the army was prohibited, although there is not a word in the Versailles Treaty authorizing such a prohibition, and although the countries surrounding Germany are all equipped with poison gases. Non-military material alone destroyed in 337 factories amounted to 2,700,000,000 gold marks.

One of the crassest injustices, and one behind which a definite purpose undoubtedly lay, was the requirement that Germany should destroy all factories making war materials, and should then build anew such as she was entitled to retain under the treaty, and—significant fact—that all these had to be located in the Rhineland. Article 168 of the Versailles Treaty does not authorize this compulsion to build new factories.

There are 295 officers in the control commission, of whom 169 are French and Belgian. Their salaries, maintenence and expenditures, payable by Germany, run above a million marks per month. The total salaries of all the officers of the German Army amount to 688,000 marks a month. Lord Newton, speaking in the English House of Lords last year, declared that "the sight of these commissions, living in luxury and profiting at the expense of a bankrupt people, is one of the most repulsive pictures that one can imagine."

There are today only a few dubious Germans who do not resent bitterly the new control inspections to which they must submit at the hands of men who themselves know perfectly well that any such inspection is an

unwise and unnecessary provocation of a helpless people. The people have at the same time learned that France's *beau geste* concerning the release of German prisoners was an empty gesture; the prisoners were, it is true, released from St. Martin de Ré but only to be reincarcerated in French mainland prisons.

They hear Herriot and Theunis declaring that the evacuation of the Ruhr can come only after the sixteen billions of railway and industrial obligations of the Dawes plan shall have been not merely issued but actually placed, and they know that this means months and maybe years. They hear from Paris and Brussels that the Franco-Belgian control of the railways in the occupied districts is to be retained for a long time at best.

Day by day the press of the Right grows bitterer; that of the Left talks with less and less cocksureness about the "republican and pacifistic Nollet," "Comrade" MacDonald and "the dawning of a new era." The *Vossische Zeitung* warns its readers this morning that, after all, Herriot's position is not very secure, and that he has to make compromises. The Socialists and Democrats still assure everybody that all Germany's troubles are solely due to the evil German Nationals and Nationalists, but one hears in their editorials and dispatches the quavering whistle of the boy passing a graveyard at midnight.

Herriot and MacDonald continue to talk about their earnest desire to help real democracy and republicanism to a victory in Germany, but what they do and what they are apparently about to do speaks so loudly that it is difficult to hear what they say. Much of Germany's sufferings in the last years has been due to the fact that she has failed to produce any statesman of parts. It begins to look as if the same thing will eventually have to be said of France and England.

Germans Celebrate Jutland

Naval and Military Record, 25 June, 1924.—There are some things happening within their country which the German Government desires to keep quiet. One of these is the manner in which Jutland Day is commemorated. Doubtless it is due to this reason that we have only just learned of the way in which only the Association of German Naval Officers kept the occasion at Munich. The purpose of the gathering (which scarcely gained in dignity from being held in the Cerger Brewery) was "to celebrate the anniversary of the day on which the glorious German Fleet gained a victory off Jutland over the English Armada."

Officers of the old navy turned up in great strength and in full uniform. The president of the German Navy League was apparently the most popular figure of the gathering. He delivered a fiery speech, in the course of which he declared that "the spirit of the old navy must be inculcated in our youth, who, when the coming army has regained our freedom, are to re-establish our power in the world with the coming fleet." Brave words these, but rather a challenge to cynicism when one thinks of "the glorious German fleet" now being slowly routed of its last resting-place by salvage divers. That German history will always record Jutland as a German victory is certain. Probably no British historian will take the trouble to contradict the claim. Such an indecisive running fight, in which the whole object of the Germans was to get away, does not lend itself to the use of the word "victory" by either side. Von Scheer showed himself a masterly tactician, and the High Sea Fleet fought with great gallantry. Jellicoe declined opportunity of which the price was too serious to risk. We do not "commemorate" Jutland in this country; we merely pay tribute to the memory of the men who fell on that day.

JAPAN

Size Not Sole Index of Cruiser Strength

By Hector C. Bywater,* Baltimore *Sun*, 24 June, 1924.—London, June 5.—As far back as January 11, 1923, I described in the *Sun* the main features of the new cruisers which Japan was then on the point of ordering. I gave the battery of these ships as six 8-inch rifles, an item that was questioned at the time by other naval critics. My forecast, however, has since been confirmed by high authority. Replying to an interpolation in the House of Commons on April 16, last, Mr. Ammon, the Parliamentary Secretary to the Admiralty, gave the following details of the first cruisers of Japan's post-treaty program:

Name	Displacement.	Horsepower.	Armament
Furutaka	7,100 tons	100,000	Six 8-inch guns. Three 3-inch anti-aircraft guns. Four torpedo tubes.
Kako	7,100 tons	100,000	
Kinugasa	7,100 tons	100,000	
Aoba	7,100 tons	100,000	

All four ships are now under construction, two being scheduled to take the water this summer. Few reliable details are known of the four 10,000-ton cruisers of later design, two of which are already building, but it is surmised they will carry not less than eight 8-inch guns apiece.

The *Furutaka* and her three sister craft will mount the most powerful batteries of any cruiser in the world proportionate to their size. Displacing only 7,100 tons, or 400 tons less than the American *Omaha* class, they will nevertheless carry guns of a caliber hitherto associated only with big armored cruisers.

The *Omaha* is equipped with twelve 6-inch, 53-caliber, rapid-fire guns, of which she can train eight on either broadside. The maximum effective range of these weapons, which discharge a 105-pound shell, is probably about 14,000 yards. The *Furutaka* is to have six 8-inch, 50-caliber guns, firing 250-pounder projectiles, with an extreme range of 18,000 yards, or perhaps a trifle more. All the six guns in the *Furutaka*, being mounted in centerline turrets, can be used on either broadside. Thus, at a single broadside salvo the Japanese ship will be able to hurl 1,500 pounds, and, given accurate shooting, might land this mass of steel and high explosive on the target at a distance of ten miles.

On the other hand, the larger American ship can project at each broadside salvo only 840 pounds of shell, and at any range above eight miles her fire would be ineffective. So far as rate of fire goes, the *Omaha* would have the advantage, for each of her 6-inch guns probably could be discharged ten times a minute under favorable conditions; but this rapid-fire delivery would be of no avail if the enemy ship kept out of range, as it certainly would do if it carried guns with a longer reach and had an equal or superior steaming speed.

In the *Sun* article published seventeen months ago I said: "The 8-inch guns (of the new Japanese cruisers) are of the very latest model, designed and built in Japan, and are thirty-four feet long. On mountings specially designed for rapid loading, each gun can fire six aimed rounds per minute, and as the shell weighs 250 pounds, the six guns firing on the broadside can discharge 9,000 pounds of steel and explosive per minute."

*NOTE: Hector C. Bywater, the well-known naval critic whose articles are so frequently quoted in the Institute PROCEEDINGS is now writing as an independent writer, having severed his connection recently with the *Naval and Military Record*.

What is the inference to be drawn from these details? Simply that the ten ships of the *Omaha* class, the only fast cruisers which America has now, or is likely to have for several years, will be heavily outmatched in the cardinal factor of gunpower by the ships of smaller dimensions which Japan is now preparing to launch. This is not an attempt to work up a scare or to make a sensational point. It is a sober statement of fact, assuming the accuracy of the details as to the armament of these Japanese cruisers.

If war experience is to be trusted, the *Omaha* would not have a sporting chance in action with the *Furutaka*. Given equally good shooting on both sides, the ship with the heavier and long-ranging artillery is bound to win. This was demonstrated conclusively at the battles of Coronel and the Falklands. At Coronel the German ships *Scharnhorst* and *Gneisenau*, mounting between them sixteen 8-inch guns of modern design, shot to pieces the British *Good Hope* and *Monmouth*, whose collective battery consisted of two old 9.2-inch and thirty 6-inch guns. From the beginning, the British ships were outranged and overwhelmed by sheer weight of metal, while the German cruisers were scarcely touched. A few weeks later the tables were turned, when the *Scharnhorst* and *Gneisenau* were brought to action by the British battle crusiers *Invincible* and *Inflexible*, mounting 12-inch guns.

In bygone days, when ships' ordnance was in a primitive stage of development, sea fights were often won despite a handicap in number and weight of guns. In modern times, however, the warship that engages an opponent who has a marked advantage in battery power is almost certain to suffer defeat.

This point was stressed by the late Sir Julian Corbett in his official history of British naval operations during the World War. Writing of the British naval dispositions in home waters early in 1915 (Vol. II, p. 49), he remarks:

They were based on the old idea that an inferior fleet by bold offensive action might render a superior one incapable of further mischief even if it were itself annihilated. But, on December 9, had been received the news of the Falklands victory, confirming the lesson of Coronel that our time-honored belief was no longer tenable. It was pointed out how the two actions left little doubt that under modern result of an action between two unequal squadrons would be that the one with inferior speed and gunpower would be destroyed by the one that was faster and more powerfully armed, without being able to inflict upon the enemy any material damage.

What is true of squadrons is just at true of individual ships, as witness the result of the duels between the *Sidney* and *Emden* and the *Königsberg* and *Pegasus*. Length of reach and weight of punch tell every time, even more in the arena of naval cambat than in the ring.

By equipping her new cruisers with so powerful a battery Japan has stolen a march on the other naval states. Her action, of course, is quite legitimate and no exception can reasonably be taken to it. Still the effect will be to hasten a result that most naval observers foresaw when the Limitation Treaty was published. By imposing a limit of 10,000-ton displacement on all future cruisers and restricting their battery to 8-inch guns the authors virtually encouraged the building of ships of this powerful type, since no government would willingly lay down ships of inferior size and armament.

Japan, for reasons of economy, did not choose to give her first post-treaty ships full displacement of 10,000 tons. Instead she substituted 8-inch guns for the battery of 6-inch originally contemplated for these vessels, thereby endowing them with a degree of offensive power never before attained on so moderate a tonnage.

The completion of the *Furutaka* class bids fair to relegate the *Omaha* type to the second line, so far as the balance of power in the Pacific is concerned. When the 10,000-ton *Washington* cruisers, now building or projected by all the major naval states pass into service, the relative value of most existing cruisers—American, British, Japanese and French—will undergo a sharp decline because, being armed with 6-inch guns, they will be greatly inferior in fighting power to the 8-inch gun type of cruiser. This is one of the factors that tends to vitiate the conventional method of calculating relative strength by the mere counting of ships and tons.

On the basis of tonnage, four *Furutakas* would be inferior to four *Omahas,* because the aggregate displacement of the Japanese ships is about 1,600 tons less than that of the American. Actually, however, four *Furutakas* would be equal to six *Omahas* if measured by the standard of all-round battle power. While these facts may come as a surprise to laymen, they are thoroughly appreciated by the naval authorities.

Until it has in commission the eight 10,000-ton ships recently approved by Congress, the United States Navy will not possess a single cruiser of 100 per cent fighting value. The ten *Omahas* are useful enough as fleet scouts, but in view of the heavy ordnance mounted in the latest Japanese cruisers their employment on independent war service in the Pacific, either as ocean patrols or commerce protectors, would be attended with grave risk.

Further to emphasize this point I will quote from the proceedings in the House of Commons on March 20, last: "Commander Burney, Conservative member for Uxbridge, today caused a sensation during the debate on the Admiralty vote by referring to the Liberal opposition to the building of new cruisers as an 'attempt to murder British sailors.' After protests from the Liberal benches, Commander Burney eventually withdrew his remark. He explained that what he meant was that, 'in the event of war, we will have to send against the Japanese cruisers with 8-inch guns cruisers with 6-inch guns, which will result in the murder of British sailors.'"

In ocean-going cruisers of major battle power—that is to say, carrying guns heavier than 6-inch caliber—the various fleets now compare as follows:

GREAT BRITAIN

Completed—Four ships of *Hawkins* class, 9,750 tons, speed 30 knots, battery seven 7.5-inch guns.

Authorized—Five ships of the *County* class, 10,000 tons, probably armed with 7.5-inch or 8-inch guns. Total nine ships.

JAPAN

Building—Four ships of *Furutaka* class, 7,100 tons, speed 33 knots, battery six 8-inch guns.

Two ships of *Myoko* class, 10,000 tons, speed 33 knots, battery eight 8-inch guns.

Authorized—Two ships of *Myoko* class, as above. Total eight ships.

UNITED STATES

Building—None.

Authorized—Eight ships, 10,000 tons, to be armed with 8-inch guns. Total, eight ships.

Denies Quake Cost Japan Major Part of Oil Reserves

Baltimore *Sun,* 5 July.—Tokio, July 4.—Denial that the earthquake and fire in Tokio, Yokohama and Yokosuka, the Japanese naval base, last September cost the navy the major part of its oil reserves, as had been reported, was made in the lower house of the Diet today by Admiral Hyo Takarabe, minister of the navy.

The minister, answering an interpolation, said the loss was comparatively small.

"The government still is forming its oil policy, but the prospects of producing oil in Formosa and other parts of the empire are promising, and considerable progress has been made in the artificial production of oil," said the admiral. "The government is optimistic," he added.

The minister promised an early statement regarding the proposed improvement of the naval aviation force.

The minister of war, Lieutenant General Issei Ugaki, interpellated at the same session, said the army's reorganization plans for a "new weapon" program were nearing definite shape.

This program is one intended to remedy the tardiness of Japan's forces to adopt the newer types of weapons developed during the World War. Japan's actual fighting in that conflict was brief and was completed before many of the weapons later used successfully had been perfected. A commission of technical experts and army officers has been abroad for some time studying the types of weapons used by other nations as a result of experience gained on World War battlefields.

Japan Opens Oil Regions on Saghalien Island

Paris, July 4 (Special Cable).—The Japanese Navy is busy preparing an oil supply which will make it independent in the event of war. A company acting for the navy is opening new oil and oil soil regions in Manchuria.

Japanese activities in Saghalien, also with navy backing, are reported. It is said the steamer *Stravakanoura Maru* has sailed with oil-development equipment for the island.

Japan

The Current History Magazine, July, 1924.—According to press reports emanating from Japan, the present strained relations between Japan and the United States are being used by the navy department as a lever to put forth the most ambitious program of naval expansion of the decade. The navy department on April 13 announced its estimates for the restoration of properties damaged by the earthquake and to cover a ten-year program of rebuilding and replacement of arms and munitions. They called for 892,000,000 yen, or approximately $446,000,000. It was originally planned that this appropriation should be presented to the Diet as a special budget at the extraordinary session in June. Much publicity is being used to secure the adoption of this large appropriation. Soho Tokutomi, editor of the Tokio *Kokumin*, for example, speaking on the subject of armaments, said: "The Washington Conference did not solve the problem of peace. We must arm ourselves properly. I have not the slightest doubt regarding the good-will of the powers interested in the Pacific, but it is unwise to trust our national security to the good will of others."

The large destroyer *No. 15* was launched at the Fujinigata yard at Osaka in April and completed in May. She is the third large destroyer to be completed since January 1. She displaces about 1,550 tons as against 1,215 tons for the largest American destroyer.

The submarine *No. 22* collided with the naval tanker *Hondo* off Kure, April 28. It appears that the tanker was the more seriously damaged.

Naval Construction in Japan

The Engineer, 27 June, 1924.—From an official memorandum on the Japanese Navy Estimates, quoted by the Tokyo correspondent of *The Times*, it appears that eight new cruisers, twenty-four new destroyers, and twenty-two new submarines are now under construction or authorized. Only two of

the eight cruisers are actually in hand, the laying down of the other vessels having been postponed until the necessary materials are available. The two ships on the stocks are the *Kako* and *Furutaka*. These vessels were referred to by Mr. Ammon, parliamentary secretary to the Admiralty, in the House of Commons last April. According to details then given, they will displace 7,100 tons and have machinery of 100,000 horsepower. Their armament will comprise six 8-inch guns, three 12-pounder anti-aircraft guns, and four 21-inch torpedo tubes. No modern cruiser now afloat is armed with guns of 8-inch caliber, which is the maximum permitted by the Washington Treaty for ships below capital rank. The *Kako* and *Furutaka* will therefore be exceptionally powerful for their displacement. To design such ships with this heavy armament, in combination with machinery of 100,000 horsepower and the sea-going qualities and endurance essential to vessels of the cruiser type, represents a technical achievement of no mean order. It is clear that protection must have been sacrificed in the interests of gun power and speed. Of the other construction in hand or authorized for the Japanese Navy—twenty-four destroyers and twenty-two submarines—all the units belong to the revised program of July, 1923. Their completion will, however, be delayed to some extent by the necessity for reducing naval expenditure in view of the immense losses caused by earthquake.

Germans in Italy Building War Planes for Japanese

Washington *Post*, 13 July.—Paris, July 12—Bombing seaplanes of German design are being built in Italy for the Japanese Navy. They are all metal machines, which is the latest word in military flying boats, and have a fuel radius and bomb carrying capacity to enable them to export a ton of explosives from the nearest Japanese base to Manila and to return to the base.

Two weeks passed by a correspondent in Italy observing the flying boats in the process of construction shows that all are equipped with bomb racks. Dozens of German and Italian mechanics are employed in this work in the shops and hangars of the *Sociata An Enima Italienia Di Construzione at Marina Di Pisa*, while German test pilots are making trial flights over the Meriterranean. The Italian company is a child of the Dormier Mettalabauten Corporation of Friedrichshafen, which is one of the Zeppelin producing plants and at present engaged in Germany in constructing the *ZR-3* airship for the American Navy.

The interallied air control under the Versailles Treaty, preventing the construction of possible war machines in Germany, accounts for the establishment and operation of an extensive plant in Italy, but in spite of this arrangement, the airplane parts are manufactured in Germany.

The information was elicited at Pisa that the manufacturing rights of Japan for all Dormier machines and inventions have been purchased by the Mitzubishi Ship and Plans Builders, of Kobe, whose formerly extensive business of battleship contracts for the Japanese Government has suffered a depression through the terms of the Washington Conference.

The purchase figures are reported to be high in millions of yen. The transaction was consummated on May 10, at which time several Japanese naval officials visited Pisa and spent two weeks at the plant, leaving one of their number, who now is overseeing the work daily.

Three German experts from the Pisa factory left immediately for Kobe to superintend the erection of manufacturing plants there.

UNITED STATES

Mine-Laying Submarine

Washington *Post*, 20 July, 1924.—Plans and specifications for a new mine-laying submarine have been approved by the Secretary of the Navy. Authority for construction of this vessel was given by the Naval Appropriation Act of May 28.

The plans contemplate a submarine of the highest practicable speed and greatest desirable radius of action, which will enable it to accompany the fleet in overseas operations, and to cost not to exceed $5,300,000 for construction and machinery and $850,000 for armor, armament and ammunition.

This vessel is one of the nine fleet submarines that formed a part of the 1916 naval building program, of which three were authorized several years ago, and of which this is the fourth. The first of them was launched at the navy yard, Portsmouth, N. H., last week and should be ready for service trials in the autumn. The other two will follow at intervals of from five to six months.

Giant U. S. Submarine Launched at Navy Yard

Portsmouth, N. H., July 17.—A submarine twice as large as any built previously for the United States Navy was launched at the navy yard here today. This big undersea fighter, to be known as the *V-1*, is the first of a fleet of nine that will be able to accompany the battle fleet at sea in any weather and at any speed of which the fleet is capable.

Exact statement as to the radius in which the *V-1* can operate was not given out by the naval authorities, but indication that she could cross the Atlantic and return without replenishing fuel or supplies was seen in the statement that "the *V-1* can make any voyage of which the fleet as a whole is capable."

The *V-1*, the largest vessel constructed and launched at the Portsmouth yard since the Civil War, was christened by Mrs. Cornelia Wolcott Snyder, wife of Captain C. P. Snyder, U. S. N., who was manager of the yard when the submarine's keel was laid.

It is expected that the *V-1* will be commissioned in October.

The vessel is 341 feet six inches over all, has a maximum breadth of twenty-seven feet six and five eighths inches, a surface speed of 21 knots and a speed of 9 knots submerged and a surface displacement of 2,164 tons. She is so nearly self-sustaining that she will not need the services of a mother ship when in port. She will carry a whaleboat and a motor launch, each twenty-four feet long.

Fresh water will be in ample supply, the heat of exhaust gases from the Diesel engines being used, with a special oil-fired boiler and a number of electric heaters to evaporate water and provide steam.

The ventilation system is described as much more extensive than that fitted on any previous United States submarine, including provision for revitalizing the air by the addition of oxygen.

The *V-1* will carry seven officers and eighty men.

Appropriations for 1925

Army, Navy Journal, 28 June, 1924.—Although the distribution of the appropriations for 1925 has not been completed by the War and Navy Departments, the estimates for 1926 have already been taken up by the budget officers in both departments. Of course, President Coolidge will outline the general policy of the arministration for the next fiscal year, but it

is expected that General Lord will go into the details sufficiently to indicate what treatment will be given the Army and Navy estimates.

Under a provision of the Army Appropriation Bill, which was adopted in the last hour of the last session of this Congress, the War Department is asked to make a recommendation for a ten-year building program for barracks and quarters for the Regular Army. The General Staff and the branches have been giving this a very searching study for now over a year. There is no doubt that the War Department will be ready to submit this report to Congress on the day that it convenes. This will be the chief increase asked for the regular establishment. There doubtlessly will be an increase asked under the head of Organized Reserves which will be based upon the experience in this year's training camps. It is expected that the items for this purpose will grow until at least one third of the Reserve officers will be in camp each year and the C.M.T.C. will be expanded to 100,000. This is the mark set by the late President Harding and will probably be reached in two or three years if Congress will support the War Department with adequate appropriations.

It is assumed that the Navy Department will be very insistent upon including in the budget estimates for new construction. The authorities will contend that there is to be included in the estimates appropriations for the cruiser bill which was held up in the Senate by Senator King just before adjourning. The cruiser bill had passed the House and the Senate, and Senator King moved the reconsideration of the bill. In the rush to get away it was impossible to bring this motion to a vote and under the rules of the Senate a bill is not regarded as having passed as long as such a motion is pending. This will be the status of the bill when Congress convenes in December, and it is not believed that Senator King's dilatory tactics will hold it up over a week or so. The bill will be passed in plenty of time to authorize estimates for the beginning of the construction of the cruisers.

General Board Discussing Selection

The Navy General Board has taken a hand in the discussion of selection and retirement. It is stated that before the publication of the Britten letters it had under consideration a recommendation for the amendment of the retirement law so that officers could be retired for age, fixing as a basis the number of years after their graduation from the Academy. This is a substitute for the present retirement for age and grade.

Such a policy is more in harmony with the new Pay Act. The General Board has not agreed on the subject, but is simply making a study of the advisability of such a change in the law.

The United States

Current History Magazine, July, 1924.—Charges concerning the material condition of the Navy were put forth on the floor of the House of Representatives during the past month. They were the outcome of statements regarding specific weaknesses made by W. B. Shearer in The New York *Times* and by Admiral R. E. Coontz, in his report as commander-in chief of the fleet.

The Secretary of the Navy, replying to a series of twenty-seven questions prepared by Representative Fred Britten of Illinois, said that he considered the Navy to be twenty per cent under its treaty strength if some of its principal weaknesses, such as the lack of even a single real base, were not considered. The effect of the secretary's statement on Congress was to bring charges from several members that the Navy was at least forty per cent below its treaty strength. Representative Britten went

further and declared that the Navy was nearer sixty per cent below its treaty strength than the twenty per cent admitted by Secretary Wilbur. Many resolutions were offered for an investigation of the condition of the Navy, but none of them was passed. Finally the Butler Bill, authorizing the construction of eight 10,000-ton cruisers and the modernization of six battleships was reported to the House by the Naval Committee. An amendment was proposed by Representative Britten to make available $6,500,000 to elevate the guns of thirteen of the older battleships, but this was defeated. Eventually the House of Representatives passed the bill, which authorized Congress only to appropriate the funds for a small part of what is needed at a future date. In the Senate the Butler Bill was passed on first reading, but shortly before the adjournment Senator King of Utah demanded and obtained the recommitment of the bill, so that no progress has been made in the direction of bringing the Navy up to its treaty strength.

Data as to American and British Navies

By Hector C. Bywater, Baltimore *Sun*, 16 July, 1924.—London, June 26.—While in Baltimore last month I wrote for the *Sun* an article on the United States Navy and its deficiencies and requirements, so far as they were obvious to me. This article was printed in the issue of May 14. It contained a reference to W. B. Shearer, whose revelations on the same subject in the New York *Times* were exciting keen interest. Alluding to this gentleman, I observed that "the source from which he derived his figures relative to the standing of the United States Navy as against the navies of Great Britain and Japan was not disclosed, but it must be said that they do not tally with official and unofficial statistics."

Mr. Shearer returned to the charge in the New York *Times* of May 19, reiterating his statement that the present-day ratio of sea power is five for Great Britain, three for Japan and one for the United States. He wrote: "Mr. Bywater and myself should not split hairs about my figures tallying officially or unofficially. It depends on which side of the fence you are on. We both know that the American battle fleet on the Atlantic is outranged in gun range, speed, torpedo protection, deck protection, fuel capacity, radius of action, etc.; that the British outrange every ship about two miles; that we cannot overhaul or withdraw. We must stand and be plugged at. We would not register one hit."

On this and on other aspects of the American naval position, Mr. Shearer credits me with a knowledge that I do not possess. It is with no wish to engage in a barren polemic that I propose to challenge some of his very startling statements. I am as desirous as he is of seeing the American Navy maintained at the highest possible standard of strength and efficiency because of my rooted conviction that American preparedness is essential for the preservation of world peace.

I submit, however, that Mr. Shearer's methods are calculated to damage the cause he has at heart. He is spoiling a good case by reckless overstatement. One assumes that the Navy Department has a wider and deeper knowledge of the naval position than any lay critic could ever hope to acquire. One assumes, further, that the department is whole-heartedly in favor of maintaining the ratio of strength laid down by the Washington Treaty. That being so, the department would naturally feel grateful to every writer who sought, by rational methods, to spread the gospel of naval preparedness.

What, then, is the department's attitude toward Mr. Shearer and his allegations? In the report of proceedings in the House of Representatives on May 19 I find the following:

Representative French said that the Assistant Secretary of the Navy a few days ago issued a statement in response to a general criticism by William B. Shearer, wherein Mr. Shearer had stated that the ratio had been reduced from 5-5-3, with the United States one of the major factors, to 5-3-1, with the United States the 1. The statement of the Assistant Secretary of the Navy characterizes the estimate of Mr. Shearer as a gross exaggeration.

When Mr. Shearer declares that he and I both know "the American battle fleet in the Atlantic" to be outclassed in every respect by the British Fleet he is, perhaps unwittingly, resorting to sophistry. There is only one American battle fleet, which is officially designated the "United States Fleet." We must therefore treat it as an entity, whether or not any section of it—such as the Scouting Fleet—happens for the moment to be detailed for independent duty. In war, without a shadow of doubt, the battle fleet would be regarded and handled as a tactical unit.

Now, the United States fleet is most decidedly not outclassed in all respects by the British Fleet. To take a specific instance, the British do not outrange every ship about two miles. In ships able to use their guns at ranges above 25,000 yards this is how the two fleets stand today:

AMERICAN FLEET

Five Ships—*Maryland, Colorado, West Virginia, California, Tennessee.*
Extreme range, 32,000 yards.

BRITISH FLEET

One Ship—*Hood.*
Extreme range, 30,100 yards.

So much for Mr. Shearer's avowal that "the British outrange every ship about two miles" and that "we must stand and be plugged at."

Had he contented himself with saying that at ranges which, in view of war experience and normal visibility conditions, are likely to be the decisive ranges in the naval actions of tomorrow—say 22,000 to 25,000 yards—the United States fleet, as a unit, is inferior to the British, he would have said no more than the truth. This fact alone constitutes a powerful argument in favor of increasing the turret-gun elevation in the thirteen older battleships.

The danger of exaggeration in such matters is that the public, if it finds it has been deceived on one point, will be apt to conclude that all other statements about the weakness of the Navy are equally baseless and forthwith lose interest in the question.

As regards speed, the United States Fleet does not compare well with the British. Its swiftest battleships cannot exceed 21 knots and it has no battle cruisers. The British Fleet, on the other hand, has five 25-knot and five 23-knot battleships, besides four battle cruisers capable of making 28 to 31 knots. Since speed is a tactical element of high importance, the American fleet is undoubtedly handicapped by its comparative slowness.

Coming to torpedo protection, deck protection, "fuel capacity and radius of action," Mr. Shearer's claim as to the inferiority of American ships does not rest upon any data that I have seen. Only five of the British battleships—the *Royal Sovereign* class—and three battle cruisers are equipped with anti-torpedo bulges. The remaining fourteen capital ships do not have this fitting and it is a question whether their defense against underwater attack is any better than that of the American ships.

According to such diagrams as have appeared American ships of the dreadnaught era are broader in beam and more closely subdivided below water, and, therefore, better able to resist torpedoes than the contemporary vessels of any other navy except the German. As for "fuel capacity and

radius of action," which virtually mean the same thing. American designers are understood always to have laid great emphasis on this feature. Judging from the published figures, there appears to be no great disparity between the two fleets in this respect so far as heavy ships are concerned, while American cruisers and destroyers have a larger radius of action than corresponding British types.

The American shortage of cruisers is notorious. It can only be remedied by new construction on a generous scale, and Mr. Shearer does well to draw attention to this necessity. He might have added, however, that considerably more than half of the British total of cruisers is made up of ships too small or too old to be of much value in an oversea campaign.

The cruiser that will count in future wars is a ship up to or approximating to the so-called "Washington Treaty" type, which implies a vessel of 10,000 tons or thereabouts, with guns of 7.5-inch or 8-inch caliber. Of these, the United States has eight authorized but not financially provided for; Great Britain has four completed and five authorized for laying down this year; Japan has, building and authorized, four 10,000-ton and four 7,100-ton ships, all to mount 8-inch guns. If, however, ships are to be lumped together without regard to their age or fighting power, the present ratio in cruiser strength is: Great Britain, 5; Japan, 2.5; United States, 1.

Mr. Shearer says that America has 103 destroyers in commission. "All others are out of commission, and not getting better through neglect. The British have 170 destroyers in commission and service." Let us compare this with a British Admiralty return published March 17 last, which gives the following destroyer totals: Britain, 189 built and building; United States, 309 built.

As for the deterioration of the American boats which are laid up at navy yards, I would refer Mr. Shearer to the U. S. Naval Institute PROCEEDINGS of March, 1923, in which Lieutenant P. V. H. Weems, U. S. N., who had to do with the laying up of ninety destroyers at Philadelphia, wrote as follows: "At first almost everyone thought it was a pity to lay up these fine boats, and probably thought they would be a total loss. After seeing the way they are laid up, one is ready to believe they will be ready for a frolic or a fight for several years to come in case only reasonable attention is given them. A captain in the Construction Corps estimates that they will be serviceable for fifteen or twenty years to come if reasonable attention is given them."

Dealing with submarines, Mr. Shearer says: "Mr. Bywater knows the condition of our submarines if he read Admiral Coontz's report. No fleet submarines, no cruiser submarines and coast submarines are more dangerous to the crews than the enemy. The British have nineteen fleet and three mine-laying submarines to their credit. The British submarine is superior; they experiment and build all the time."

Ignoring coastal boats, the following shows the submarine strength of the two navies at the present time in craft built and building:

	British	*American*
Boats of 800 to 1,000 tons	32	50
Boats above 1,000 tons	11	6

The alleged superiority of the British submarine is purely a matter of conjecture. Admiral Coontz, it is true, criticized his submarines rather severely, but it should be remembered that, outside the United States, no such candid criticisms of naval material by an officer would ever be released for publication. It is a fair surmise that the best American submarines are as good as the best in any other navy. Incidentally, Britain's effort in the direction of "experimenting and building all the time" has

been limited, so far, to the laying down of two submarines since November, 1918.

It is certainly a surprise to learn that "the British control the world's oil supply." There was an impression here that America occupied that enviable position. In naval aircraft, Mr. Shearer says, Britain is fifty-eight per cent strong and America only sixteen per cent. If he took the trouble to hunt up the published figures he would find that the British Navy at the present time has fewer airplanes than the American Navy and, further, that it labors under the crippling handicap of not having an independent air service, such as the American Navy possesses.

In conclusion, I would ask Mr. Shearer whether he has considered the possible effect on American public opinion of his overstatement of the Navy's defects. When the average taxpayer reads that the Navy upon which untold millions of public money has been spent is hopelessly inferior to foreign navies, that is battleships and submarines are obsolete and inefficient and that it is utterly outclassed in every element of fighting power, is he not likely to say: "Well, if that's the way my money has been wasted, why spend any more of it on so-called naval 'preparedness?'"

Persistent exaggeration of the Navy's shortcomings tends to undermine public confidence in the service and, unless it enjoys such confidence in full measure, nothing can prevent it from falling into neglect and consequent decay.

We Have No Air Defense

Boston *Transcript*, 12 July, 1924.—"When I go back to New York," said Lieutenant Maughan, "I shall take your entire air-fighting force with me."

In other words, the ship in which Maughan flew across the United States is the only fast fighting plane on the Pacific Coast.

The air forces of the United States Army possess only twenty-five such planes.

France for example, has 1,000; perhaps 2,000 by this time.

The entire plane equipment of the United States Army consists of machines now several years old. They will all be obsolete soon.

The purpose of Lieutenant Maughan's flight across the United States, explicitly declared by himself and Colonel Gillmore, was to wake the Pacific Coast to the fact that it is entirely unprotected in the air.

The lesson is serious. It is one to be taken to heart by the whole country. The plain fact is that the United States has an insignificant military flying equipment. Another plain fact is that we are letting that equipment go out of date without doing anything to replace it.

In case of need we want to be complete masters of the air above the coasts of the United States. If the emergency came tomorrow we would be helpless in the air. The emergency, which we hope will never come, may come on any tomorrow. It is insanity not to be ready.

It is proposed that Congress appropriate $25,000,000 for flying equipment for the Army. If that appropriation is not made, within two years, said Maughan, our flying force will have nothing to fly with.

What is $25,000,000 compared with the damage an invading air force could do in one day!

MERCHANT MARINE

Foreign Shipping Lines Accused by U. S. Board

Baltimore *Sun*, 17 July, 1924.—Washington, July 16.—Charges that hostile foreign shipping interests, under the guise of opposition to flag discrimination, are "moving to attack and ultimately destroy the coastwise laws of

the United States" are made in a memorandum addressed to Secretary Hoover and made public today by the Shipping Board.

The memorandum, prepared by Vice-chairman Plummer, was forwarded by the board in connection with the sailing over a week ago of the Lamport and Holt steamer *Voltaire* from Philadelphia to Halifax, N. S., and St. Johns, N. F., with 550 Pennsylvania members of the Order of Elks. Instead of proceeding direct to its destination the *Voltaire*, it is alleged, dropped its passengers, who were delegates to the Elks' Convention in Boston, for five days in that city and then proceeded on its trip to Halifax and St. Johns.

Customs authorities at Boston since have fined the Lamport and Holt Line $110,000, or $200 a passenger, for alleged violation of American shipping laws excluding foreign-flag vessels from coastwise trade. The Department of Commerce, which had received protests from American shipping companies against the *Voltaire's* voyage, is understood to consider the case closed unless the British line appeals the decision of the Boston authorities. The board's memorandum, written before the *Voltaire* sailed, declared the board had been informed that the ship was preparing to take aboard at Philadelphia a large party of Elks "to land them in Boston." At the conclusion of the convention there, the memorandum said, she was to proceed to Halifax and St. Johns, and "en route on her return to land the party of Elks again at Philadelphia, the pretense being that this is really a trip from Philadelphia to Halifax and St. Johns, with no real landing of passengers in Boston."

"Of course," the memorandum added, "the subterfuge of touching at the British ports of Halifax and St. Johns, makes this none the less a violation of the coastwise laws of the United States, which the Department of Commerce is charged to enforce."

"Under the guise of opposition to flag discrimination," the memorandum continued, "there is abundant evidence that hostile foreign interests are moving to attack and ultimately destroy coastwise laws of the United States. That the present British and Continental movement against flag discrimination includes a systematic effort to force the repeal and abandonment of the coastwise policy of this nation, was openly proclaimed by the president of the Liverpool Ship Owners' Association in his formal address at the recent annual meeting of that association. The Lamport and Holt liner *Voltaire* is owned by one of the member companies of the Liverpool Steamship Owners' Association.

Shipping Board Selects Type of Diesel Engines

Baltimore *Sun*, 14 July, 1924.—Washington, July 13.—The Shipping Board's committee on Diesel engines has recommended the adoption of proved types of slow-speed, direct-connected engines for installation in the twelve single-screw freighters selected for initial conversion under the Diesel motor program. The board has $25,000,000 for the purpose and it hopes to convert approximately sixty cargo vessels into motor ships.

While urging the first step in the conversion program be governed by a careful choice of standard and tried types, the Diesel committee called attention to the desirability of encouraging the developing of the double-action internal combustion engine, which is declared to be the more modern and capable of speedier propulsion. The committee is expected to give due consideration to the latter type in discussing further conversions.

Specifications are now being drawn for the first twelve conversions and contracts on which all sections of the country will be accorded an opportunity to bid will be let as rapidly as possible after the plans are completed.

The Shipping Board Starts Motorship Construction

Power, 24 June, 1924.—When this country embarked upon its shipbuilding campaign during the war, many engineers urged the Emergency Fleet Corporation to place Diesel engines in at least a few of the fifteen hundred vessels built for the government. Since it was assumed that reciprocating steam engines and geared turbines could be built in less time than could Diesels, the authorities turned their backs upon all arguments in favor of the oil engine. Even after the war's demands for ships ended, there were hundreds of boats turned out fitted with steam propulsion. In only one instance, the *William Penn*, was a Diesel installed, and those Diesels that had been contracted for, were left high and dry until private concerns took them off the Shipping Board's hands at bargain prices; some of these units, although eminently suited for marine service, were installed in stationary plants. In the meantime scores of the hastily constructed vessels were laid up by reason of trouble with the geared turbines.

The Shipping Board now turns to the Diesel and has persuaded Congress to permit it to spend twenty-five million dollars on the conversion of these steam vessels to Diesel drive. In fact, although the country has expressed strong disapproval of a subsidy, the bill as passed is the best kind of subsidy the shipping interests could draw. The vessels may be purchased at a few dollars per ton and Diesels installed by the buyer, or the Board will install the new engine and then turn over the ship to the buyer on an installment-payment plan.

The questionable part of the plan is suitability of these vessels to accommodate oil engines. Many proved to be veritable sieves, being unable to stand the vibrations set up by the turbines or engines. How they will endure the more severe vibration of the oil engine is open to question. To the layman the entire plan has the appearance of placing a good engine in a faulty container. In addition, not being designed for the oil engine, the space available for the engine will be exceedingly congested. The future, in all likelihood, may reveal that the wise course might have been to discard existing vessels and openly subsidize private owners who desired to build motorships.

ENGINEERING

Convenient Analysis of Modern Plant and Application to Ship Propulsion

Power, July, 1924.—Conservatism was stressed by Eskil Berg, in addressing the Metropolitan Section of the A.S.M.E. some weeks ago, concerning the advantages of a modern high-pressure steam plant as applied to ship propulsion. In spite of the fact that reheating would prove beneficial, and probably practical as subsequent discussion brought out, this was not included in the 550-lb., 750-degree, 40,000-kilowatt plant for propulsion. The bulky piping characteristic of reheating equipment of the present time, though not a necessity, might be cited as an objection to the entire scheme. While allowing for heat and electricity, as required for ship use, a shaft horsepower per 0.55-lb. of fuel oil is deduced.

The plants of a few years ago delivered a kilowatt with fourteen pounds of steam going to the condenser. With the adoption of high pressure, superheat, reheat and bleeding, this figure can be cut to less than half, which means that the condenser loss per kilowatt-hour is similarly reduced. Since the steam turbine today has reached a point of development where its efficiency is within a small percentage of that theoretically obtainable, power-plant improvement has been along the lines of heat cycles rather than improvement of the prime mover.

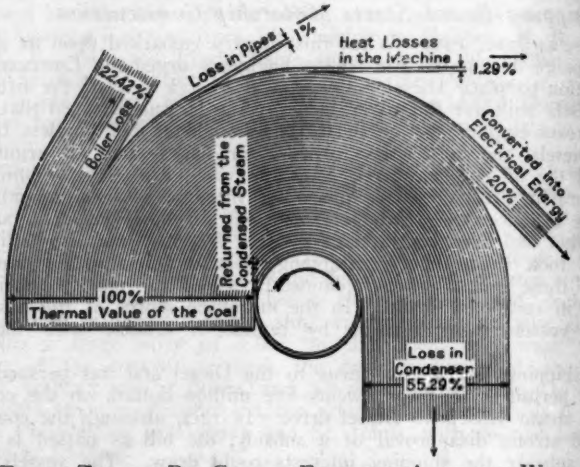

Loss in Pipes 1%
Heat Losses in the Machine 1.29%
22.42% Boiler Loss
Returned from the Condensed Steam 20%
Converted into Electrical Energy 20%
100% Thermal Value of the Coal
Loss in Condenser 55.29%

FIG. 1—TWENTY PER CENT OF ENERGY IS AVAILABLE WITH 250-LB. 200-DEG. SUPERHEAT STEAM

Increasing the steam pressure gives more available energy in the course of expansion to the usual vacuum. The total heat in a pound reaches its maximum at 370 pounds absolute, remaining constant to 395, and decreasing slightly to 1,200 pounds. In spite of the fact that the total heat lowers between 305 and 1,200 pounds, more energy is available from expansion under these conditions. In raising from 200 to 1,200 pounds, the total heat is reduced 1.58 per cent, while the energy is increased about 24 per cent, which means a net theoretical gain of 25.5 per cent.

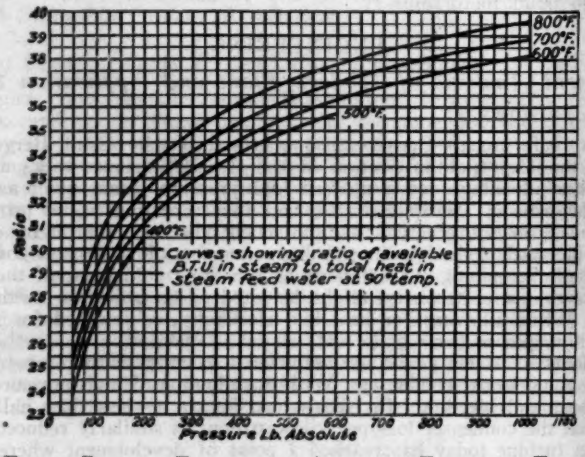


FIG. 2—RATIO OF THEORETICAL AVAILABLE ENERGY IN FUEL WITH 90 DEG. FEED WATER

In Fig. 2 the ratio of the available energy in steam expanded to a 28.5-inch vacuum, giving credit for returned feed water at a temperature of 90 degrees F., is shown. This represents a perfect prime mover and boiler. Its application to a plant of average steam conditions of 250 pounds, 200 degrees superheat is indicated in Fig. 1. Twenty per cent of the value of the coal is converted into electrical energy. This may be derived from Fig. 2, which gives 32.8 per cent with perfect boilers and turbines. By assuming 61 per cent as an over-all plant efficiency for the best conditions, we find that 20 per cent of the power energy is available as electricity.

The theoretical gains by steam extraction for heaters when bleeding at 1, 2, 3, 5 and 20 stages, are indicated in Fig. 3. These curves are calculated for 500-lb. gage, 725 degrees F., and 29-inch vacuum. They can be used with comparatively small error for other pressures and temperatures. Taken in connection with Fig. 2, a plant using the extraction cycle may be approximated in efficiency by assuming the proper boiler, prime mover and other losses.

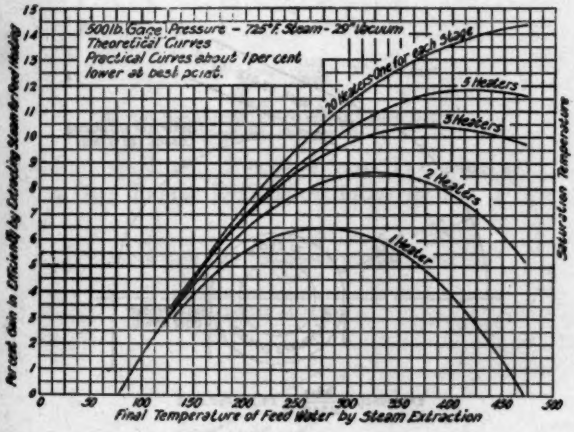

500 lb. Gage Pressure – 725° F. Steam – 29" Vacuum
Theoretical Curves
Practical Curves about 1 per cent lower at best point.
20 Heaters-One for each Stage
5 Heaters
5 Heaters
2 Heaters
1 Heater
Saturation Temperature
Final Temperature of Feed Water by Steam Extraction

FIG. 3—EXTRACTION GAIN FIGURED AT 500 LB., STEAM, BUT CORRECT WITHIN 2 PER CENT FROM 200 TO 1,000 LB., WITH USUAL HEATERS

If the steam admitted is initially dry and saturated, the gain would be larger than is shown in Fig. 3, by several per cent. If the curves in Fig. 3 are used for 200-pounds pressure, 20 heaters, they will read 3 per cent high, but if for only three heaters, 1 per cent, and correspondingly less for fewer heaters. For 1,000 lbs. these are from 3 to 1½ per cent low for the range between 20 and 3 heaters. In practice two to four heaters are ordinarily used, so that Fig. 3 is sufficiently accurate for quick approximation, at ordinary pressures.

Stages for extracting steam are selected in accordance with the temperature range between that of the condensate and the ultimate temperature of the feed water for the boiler. The steps of extraction are usually laid off at equal temperature intervals, as near as possible. The first extraction is ordinarily at 3½ to 4 pounds abs., corresponding to 147 or 153 degrees F. If it is desired to raise this to 300 degrees in three heaters, the remaining 150 would be taken from stages having temperatures of 231 and 306 degrees, allowing 6 degrees temperature difference in the heater.

Figs. 2 and 3 can readily be used for approximating advanced steam conditions as in Figs. 4 and 5. In neither case is an allowance made for loss due to boilers, auxiliaries or piping. The prime mover can be assumed at 76.7 per cent efficiency for purposes of illustration, representing here a tentative design. In Fig. 4 we find that for 350-lb. 725 degrees steam the available energy is 35 per cent. If feed-water heating to 290 degrees is employed with three heaters, the gain should be 9.8 per cent, from Fig. 3. The available energy ratio therefore would be 9.8 per cent greater than 35, which is 38.5 per cent. Multiplying this by the assumed prime-mover efficiency of 76.7, we find that 29.5 per cent of the energy is available without consideration of boiler, auxiliary or piping losses.

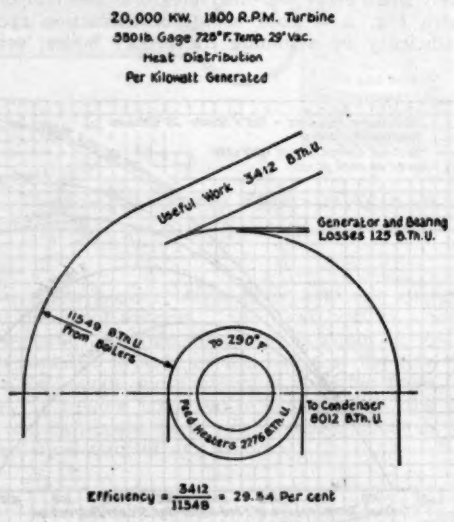

20,000 KW. 1800 R.P.M. Turbine
350lb. Gage 728°F. Temp. 29" Vac.
Heat Distribution
Per Kilowatt Generated
Useful Work 3412 B.Th.U.
Generator and Bearing Losses 125 B.Th.U.
11549 B.Th.U. From Boilers
To 290° F.
Feed Heaters 2276 B.Th.U.
To Condenser 8012 B.Th.U.
Efficiency = 3412/11549 = 29.54 Per cent
For Fuel Consumption, Efficiency of Boiler must be Allowed for, also Auxiliaries

FIG. 4—BLEEDING CYCLE RETURNS HEAT; EFFICIENCY OF BOILER AND PIPING NOT CONSIDERED

In Fig. 5 we obtain from Fig. 2 for 550-pound, 725-degree steam, a ratio of 37 per cent. Feed-water heating with three heaters to 300 degrees gives 10 per cent gain. The ultimate ratio is then 10 per cent more than 37, which is 40.7 per cent. Multiplying this by the prime mover unit efficiency of 76.7, we obtain 31.3 per cent as the ratio of available energy without the consideration of boiler auxiliary or piping losses. These and other incidental losses should be included in order to conform to practical conditions.

Reheating the steam after it has passed through part of the expansion in a prime mover and then returning it for remaining expansion, becomes more necessary as pressures are raised. This is because the final temperature is limited by strength of materials. The effect of water condensing in the lower stages becomes more pronounced as steam pressures are increased. The theoretical gain is small, being about 3 per cent when steam

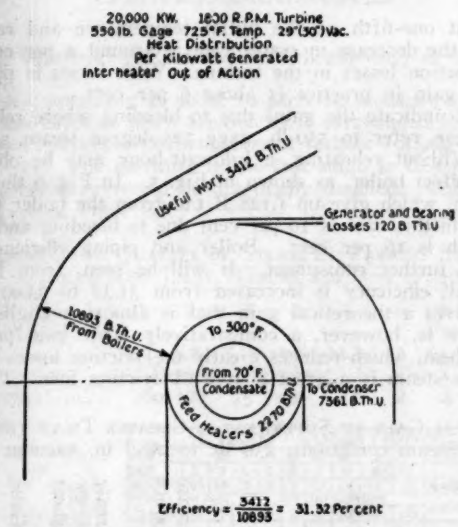

20,000 KW. 1800 R.P.M. Turbine
550 lb. Gage 725°F. Temp. 29"(30")Vac.
Heat Distribution
Per Kilowatt Generated
Interheater Out of Action
Useful Work 3412 B.Th.U
Generator and Bearing Losses 120 B.Th.U
10893 B.Th.U. From Boilers
To 300°F.
From 70°F. Condensate
Feed Heaters 2270 B.Th.U.
To Condenser 7361 B.Th.U.
Efficiency = 3412/10893 = 31.32 Per cent
For Fuel Consumption, Efficiency of Boilers Must be allowed for, also Auxiliaries

FIG. 5—HIGHER PRESSURE AND TEMPERATURE GIVE BETTER EFFICIENCY THAN IN FIG. 4

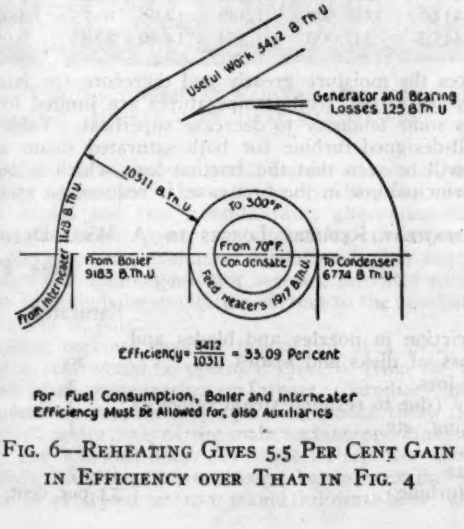

20,000 KW. 1800 R.P.M. Turbine
550 lb. Gage 725°F. Temp. Reheat to 725° at 100 lb. 29"(30")Vac.
Heat Distribution
Per Kilowatt Generated
Interheater in Action
Useful Work 3412 B.Th.U
Generator and Bearing Losses 125 B.Th.U
10311 B.Th.U
From Interheater 1438 B.Th.U
To 300°F.
From Boiler 9183 B.Th.U.
From 70°F. Condensate
Feed Heaters 1917 B.Th.U.
To Condenser 6774 B.Th.U.
Efficiency = 3412/10311 = 33.09 Per cent
For Fuel Consumption, Boiler and Interheater Efficiency Must Be Allowed for, also Auxiliaries

FIG. 6—REHEATING GIVES 5.5 PER CENT GAIN IN EFFICIENCY OVER THAT IN FIG. 4

is withdrawn at one-fifth of the initial temperature and reheated to the original, while the decrease in water rate is around 4 per cent due to the reduction of friction losses in the turbine. With losses in piping of 1 per cent, the total gain in practice is about 6 per cent.

Figs. 5 and 6 indicate the gains due to bleeding where reheating is also employed. These refer to 550-lb. gage 725-degree steam and 300-degree feed water. Without reheating, a kilowatt-hour may be obtained with a theoretically perfect boiler, as shown in Fig. 5. In Fig. 6 the reheaters are placed in action, which give up 1,128 B.t.u. from the boiler to the turbine. The total gain in this case is 10 per cent due to bleeding and 6 per cent to reheating, which is 16 per cent. Boiler and piping efficiencies should be considered, for further refinement. It will be seen, from Figs. 5 and 6, that the over-all efficiency is increased from 31.32 to 33.09 per cent.

Superheat gives a theoretical gain that is almost negligible as given in Table I. There is, however, a comparatively large gain practically as a result of superheat, which reduces greatly the friction losses in the turbine. Moisture in the steam is a great source of friction loss. The addition of

TABLE I—ACTUAL GAIN BY SUPERHEAT IS GREATER THAN THE THEORETICAL
Steam conditions, 250 lb. to 28½ in. vacuum

Deg. Superheat	Temp. Deg. F.	Avail. Heat	Corresponding Ft., Lb.	Total Heat	Per Cent Increase in Fuel to Produce Superheat	Per Cent Increase Available Energy Due to Superheat	Net Theo. Gain, Per Cent	Decrease in Water Rate, Per Cent	Actual Gain, Per Cent
0	406	369.9	288,000	1,201	....	...	...	..	..
50	456	381.4	297,000	1,233	2.66	3.11	.45	4	1.34
100	506	393.5	306,000	1,264	5.25	6.38	1.14	8	2.75
150	556	405.9	316,000	1,292	7.57	9.74	2.17	12	4.43
200	606	418.7	326,000	1,320	9.90	13.22	3.32	16	6.10
250	656	431.8	326,500	1,346	12.08	16.75	4.67	20	7.92
300	706	445.3	347,000	1,374	14.40	20.4	6.00	24	9.6

superheat reduces the moisture greatly and therefore the friction loss. As steam pressures are raised, while temperatures are limited by physical conditions, there is some tendency to decrease superheat. Table II shows the losses in a well-designed turbine for both saturated steam and 200 degree superheat. It will be seen that the friction loss, which is 20 per cent, and therefore the principal one in the first case, is reduced to 15 per cent by the

TABLE II—SUPERHEAT REDUCES LOSSES IN A WELL-DESIGNED TURBINE

	Loss, Per Cent	
	Saturated	200 Deg. F. Superheat
Loss due to friction in nozzles and blades and windage loss of disks and blades.....	20	15
Steam-leakage loss	3	3
Rejected energy (due to residual steam velocity)	3	3
Bearings, packing, etc	1	1
Total loss	27	22
Efficiency of turbine	73 per cent	78 per cent

application of superheat so that the over-all efficiency is increased from 73 to 78 per cent.

A turbine disk operating at about 10 per cent moisture under certain conditions produces twice as much friction as if surrounded by saturated steam. Fig. 7 indicates temperatures throughout a turbine for 265-pound steam 250 degree superheat. The moisture in the last stage is 10.5 per cent; without superheat the moisture would be practically doubled. The stage heat conditions are given in Table III.

TABLE III—COMPARING QUALITY OF STEAM IN VARIOUS STAGES WITH DRY INITIAL STEAM AND THAT HAVING 250 DEG. OF SUPERHEAT

Stages	1	2	3	4	5	6	7	8	9	10
Quality of Steam							Per Cent Moisture			
Dry initially.....	4.4	6.8	8.15	9.8	11.5	13	14.5	16	17.3	18.7
Quality of steam	Degrees Superheat						Per Cent Moisture			
250 deg. superheat.....	160	120	75	30	0.6	2	4	6.5	8	10.5

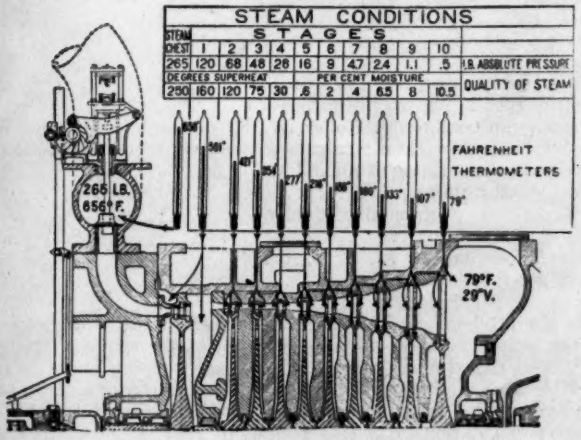


FIG. 7—SUPERHEAT REDUCES MOISTURE CONSIDERABLY IN LAST SIX STAGES

The ship-propelling equipment would consist of two 20,000-kilowatt turbo-generators, two 25,000 shaft horsepower synchronous motors for driving the propeller shafts and two 2,000-kilowatt alternating-current motorgenerator sets for furnishing power for alternating-current, motor-driven auxiliaries. For steering gear, excitation current and other auxiliary d. c. power, two 500-kilowatt d. c. motor-generator sets are provided with one 35-kilowatt d. c. generator for supplying excitation current to the auxiliary a. c. generator when maneuvering in port.

The propelling turbines operate practically at a base load. The four motor-generator sets would be operated directly from the main power generators, except when maneuvering or in port. Auxiliary attachable turbines and a condenser are supplied for operating under these conditions.

The calculated water rate of the main turbine operating under full power is 8.75 pound per kilowatt-hour. A shaft horsepower should be produced on 6.725 pounds, including motor losses, but not excitation. Alternating-current power is produced at 10.1 pound kilowatt-hour, and direct-current at 10.35.

Steam for feed-water heating and other purposes is extracted in three sets of 20 pounds, 40 pounds and 75 pounds respectively. This heats the feed water successively to 220, 260 and 300 degrees F.

The combined boiler, superheater and air-preheater efficiency is taken as 86 per cent. Table IV gives an analysis of calculations indicating fuel required for the production of a shaft horsepower. Steam for heating the oil, heating the vessel, cooking, and electricity for all purposes are figured in. The subject of reheating is omitted, as the bulky piping might be considered impracticable aboard ship. The propeller speed is 120 r.p.m.; 3,500 pounds of steam and 675 kilowatt-hour of electricity, are utilized for ship purposes. Conservative calculation gives 0.55 pounds of fuel oil per shaft horsepower, representing a large saving over direct steam drive, as at present.

TABLE IV—SUMMARY OF STEAM AND FUEL CONSUMPTION FOR HIGH-SPEED PASSENGER SHIP

Load on main turbine generator	Kw.
Main propelling turbine, 50,000 s. h.p., 97 per cent eff.	38,500
Auxiliary a. c. motor generator set, 1,965.3 kw., eff. 86 per cent	2,270
Aux. d. c. motor generator set, 465 kw., 84.5 per cent eff.	550
Total kw.	41,320
Steam consumption	lb. steam per hr.
Main turbine, 41,320 x 8.75	361,550
Steam admitted in lieu of that extracted for feed water, heating of vessel, etc.	43,700
Air ejector	2,500
Total steam consumption	407,750
Pounds steam per s. hp.-hr. all purposes	8,155
Fuel consumption conditions: Boiler eff., 86 per cent; heat value of 1 lb. of oil, 19,000 B.t.u.; calculated feed-water temp., 300 deg. F.; relative evaporation from and at 212 deg.	16,838
Factor of evaporation	1.1335
Actual evaporation per pound of fuel oil	14.855
Pounds fuel oil per hour	27,450
Tons of fuel per day	294
Pounds oil per ship horsepower	0.55

Reducing the Cost of Relining Boiler Furnaces

Power, 24 June, 1924.—The modern method of operating boilers at 200 to 300 per cent rating has permitted a decrease in boiler-room investment. Unfortunately, the high furnace temperatures accompanying such ratio of heat transfer rapidly destroy ordinary furnace linings to such an extent that boiler ratings are dependent upon the character of the refractories used in the furnace. It is, of course, possible to reduce the temperatures by increasing the amount of excess air entering the furnace, but this adversely affects the boiler efficiency. While there are more grades of brick than good, bad and indifferent, even the best quality will spall after more or less service, and the cost of renewing portions of, or all, the lining runs from ten cents to thirty cents per square foot of boiler-heating surface per year. This, even in a plant of 50,000 sq. ft. of boiler surface, is a serious item. While various kinds of cements and plastic materials have been used as a patching material with more or less success, strangely a most successful and economical lining material has been found to be a combination of crushed used firebrick, fireclay and sodium silicate (water glass) applied by means of an air gun in the form of a spray.

By this method a dry mixture of the refractories to be used is placed in a closed receptacle and by air pressure is forced out through a hose and nozzle. Water mixed with water glass is added to the dry mixture at the nozzle, but only to an extent to give hydration; that is, just enough to make the mixture a plastic mass, but not enough to permit water to be squeezed out upon being pressed.

This plastic mass leaves the nozzle with considerable velocity and on striking the furnace walls not only forms a covering, but apparently penetrates the fused surface sufficiently to form a bond with the old material.

In one plant where this method of furnace repair has been most successful, the first step is to apply a slurry or grouting of Esso Bond No. 35 and water. This is done with an ordinary compressed-air atomizer. Immediately following this the ground firebrick and fireclay is shot on with a cement gun.

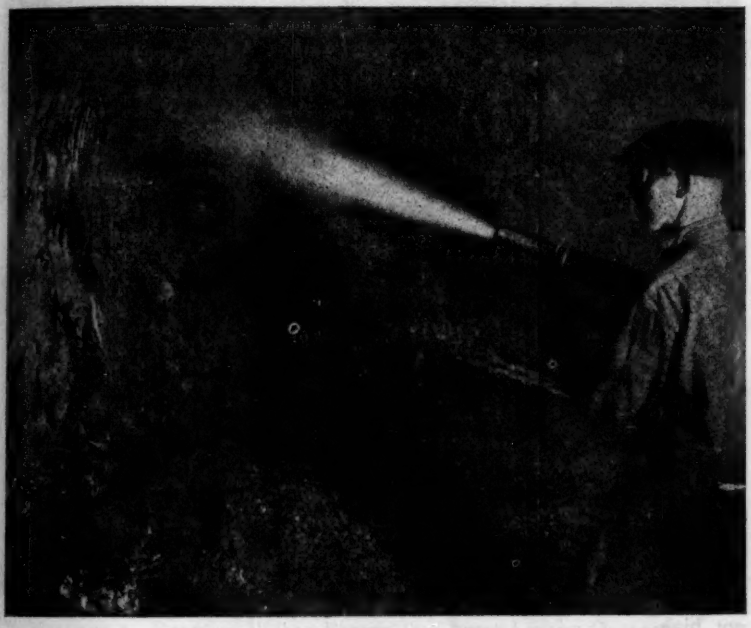


FIG. 1—SHOOTING A FURNACE LINING

Hydration is obtained at the nozzle by the use of one pound of 35 degrees Baumé water glass per gallon of water. The lining is ordinarily shot on to a depth of three-fourths to one and one-half inch. If the glaze on the old lining is smooth, about three-fourth inch is found the most suitable, but where the walls are rough it is possible to build up to several inches of thickness. In oil-fired furnaces the salt in the oil increases the tendency to glaze; this heavy glaze must be removed before the relining is applied.

Within five or six hours after the relining is completed, a fire is built and the fresh walls given a drying out for about an hour, after which the boiler is brought up to header pressure and cut into service. It has been found that if the furnace walls are hot when the mixture is applied, the boiler should be put into service as soon as possible. This is to prevent the new lining from drying out and falling off before the fireclay has been

burned. On the other hand, where the mixture is applied to a cold wall, a quick hot fire will cause the lining to peel. This is no doubt due to the water in the mixture being converted into steam and by expansion forcing the lining away from the old wall. The advantage of applying the mixture to a hot wall is that the water used for hydration will evaporate as rapidly as applied, leaving a bonded surface for the next coating. Of course walls can be too hot, and the operator must determine the proper temperature by the amount of work to be done. An emergency repair may be done at a high temperature, while a temperature of 240 to 275 degrees is ample in event a large area is to be shot.

How often the lining should be renewed depends on the service conditions. Where boilers are operated at high ratings, a procedure adopted by several large plants is to apply a three-fourth inch coating once a month. This is about the amount burned away in a month, and this method keeps the wall thickness fairly constant.

Various experiments have been made as to the proper proportions of the mixture. Some have found that brickbats ground fine, when mixed with water and sodium silicate, make a satisfactory material. But it may be stated with some assurance that there must be either some fireclay or water glass if the bond is to be satisfactory. Ground firebrick is in itself non-bonding, in that, in the kiln burning, all the water of crystallization and that resting between each minute particle of clay has been evaporated and cannot be introduced a second time. Grinding the burned brickbat does not in any way decrease the inability of the burned particles tto form a bond regardless of the amount of water used. In instances where engineers have used the ground brick without the addition of fireclay, the favorable results are to be attributed, not to the bonding qualities of the brick dust, but to the water glass added, which by coating each particle of brick dust, acts as the bond. This is its sole mission, notwithstanding the prevalent belief that the water glass serves to prevent cracks by its ability to expand.

Fireclay which contains a large percentage of silica is by far the best bonding medium and, if used in proper proportions, eliminates the necessity of the water glass. Results in the field indicate that twenty per cent fireclay added to eighty per cent by weight of crushed brick makes a satisfactory bond; as a precaution one pound of water glass may be added to each gallon of hydrating water. Naturally, the fineness of the ground brick alters the percentage of clay needed, the amount increasing with the fineness. In all events the brick should be fine enough to pass a one-sixteenth inch mesh screen and at least twenty-five per cent should pass through a 100-mesh. The disadvantage of the coarser particles is that they have considerable mass and, when striking the wall at high velocity, may rebound. This is especially true if the percentage of bonding material is not high.

Frequently it has been found that, by reason of the condition of the old walls, if enough water be added at the nozzle to make the new mixture stick to the walls, the entire mass falls off. In such cases, if the workman will go over a section, say, four to six feet square, rapidly with a very light wet coating and then follow it up with a dryer coating, the lining will stick.

The same mixture may be successfully employed to rebuild water-tube boiler baffles. In several instances asbestos fiber has been added to increase the bonding. A special nozzle is required of sufficient length to be passed up between the tubes.

Since there must be a surface against which the mixture may be applied, either the old baffles must be left in place to act as the background or a backing of some kind provided. In one plant the backing was obtained by cutting squares of heavy tar paper with holes in their centers to accommodate the tube. The squares were then cut, and being slipped up

between the tubes, were passed over the proper tube. To hold these squares in place wires were passed between the rows of the tubes both in front of and behind the paper.

In a second plant long wooden slats were interlaced between the tubes to act as the backing until the mixture had dried. The slats were not removed before the boiler was put into service, but were gradually burned away. Such baffling, when applied properly, has been decidedly successful.

Special emphasis should be placed on the character of the fireclay used in the mixture. While it seems highly probable that any fireclay will do provided any deficiency in bonding power it may possess be compensated for by the addition of the necessary amount of water glass, reports from several plants indicate that Bours Cement, No. 1 Firefrax, Thermolith,

FIG. 2 TO 5—FURNACE WALLS BEFORE AND AFTER LINING OPERATION

Carborundum, Hytempite, LaClede Christy, Red Flame and Hall High Temperature Cement have given good results.

The success of the process of furnace relining is dependent not only upon the character of the mixture, but upon the amount of water added. If there be an excess, the mass, upon striking the wall, will not stick in position but will gradually slip. It is for this reason that the old method of blowing a grouting having an excess of water was a failure. The "cement gun," which combines a receptacle out of which the dry mixture is forced by air pressure and a nozzle on which the water is added, has been decidedly successful.

While the relining is a fairly simple process, it requires careful manipulation. Unless the operator has some experience, he will have trouble with plugging of the air hose with air, etc. Since the mixture must reach

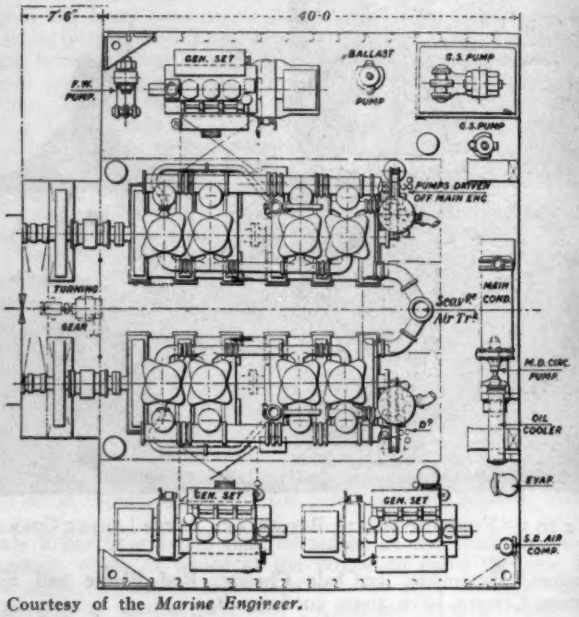
the nozzle in a dry state, moisture in the air used to force the dry materials out of the tank to the nozzle, will cause clogging of the discharge line.

Reports from plants making use of this relining process indicate that it is not only economical in cost of application, but has the added advantage of keeping the boiler off the line but a few hours and permits continued use of the old furnace.

Voyage Results of Scott-Still Engine

The Nautical Gazette, 5 July, 1924.—In a recent issue of *The Nautical Gazette* there appeared a description of the Scott-Still engines installed on the *Dolius*, and it will be remembered that this engine is remarkable in that it is a combination Diesel and steam engine.

Since this description was printed, the *Dolius* has made a trip with cargo from Cardiff to Algiers and back to Rotterdam. The details of her first voyage which are given below are very interesting, since this engine is the pioneer of its type in the marine field.



Courtesy of the *Marine Engineer.*

DIAGRAM SHOWING THE GENERAL ARRANGEMENT OF THE MACHINERY SPACE ON THE "DOLIUS"

After having successfully completed her trials, the *Dolius* left the Clyde for Cardiff and there loaded a cargo of coal. She left this port late on April 19 and got under way on her first real voyage at a speed of 11.84 knots with her engines making 126 r.p.m. The speed had to be reduced early the next day, on account of fog, to 7 knots at an engine speed

of 80 r.pm. Very early in the morning of the twenty-first, however, her speed was again increased to full ahead, and up to April 23 she averaged 11.1 knots at a mean engine speed of 121 r.p.m., and a fuel consumption of eight tons per day of twenty-four hours. Her speed was then increased somewhat in order to make up time, and on the twenty-fifth she reached her destination, Algiers. Her average speed for the entire outward voyage was 11.45 knots, and the fuel consumption 8.4 tons per day. In connection with the latter, however, it must be noted that this figure covers all uses, including auxiliary scavenging-blower motor, cooking and heating. The total distance by the log was 1,443 miles, by the screw 1,506 miles, and the ship made the distance in one hour less than six days.

On the next leg of her voyage, from Algiers to Rotterdam, the average fuel consumption came to 8.239 tons per twenty-four hours, which, it will be noted, is less than the outward consumption. The distance of 1,817 miles was covered in seven days, and the average speed was 10.81 knots. That her speed on this leg is less than on her outward voyage is due to adverse tides that were met with in the Channel.

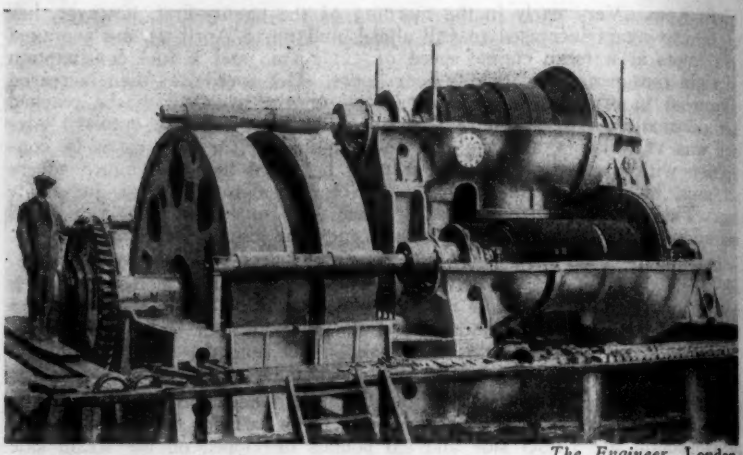
When the port engine was on the test bed, it developed 1,425 i.h.p., the mean indicated pressure being 84.4 pounds. This is made up of 77.8 pounds developed on the Diesel side and 6.6 pounds developed on the steam side but referred to the Diesel side. The fuel consumption on the test bed was found to be .356 pounds of Diesel oil per brake horsepower per hour. On the outward run, the ship had a displacement of 10.480 tons which is only about 530 tons less than her full load displacement, and on this trip the total indicated power developed by the engines was 2,434 h.p. while running at a speed of about 128.5 r.p.m. On the next leg, from Algiers to Rotterdam, the total indicated engine-power developed was 2,340 h.p., the engine speed being about 123.5 r.p.m. While running at 12 knots on her outward voyage the ship exceeded her contract speed by 1 knot, so that it will be seen that there is an ample reserve of power available to drive the ship should the occasion arise.

As regards her maneuvering ability, it was found possible to work the ship into Algiers harbor under her own power and to dispense with the aid of tugs. It was found that about eight seconds elapsed between the giving of an order on the bridge and the execution of it. The *Dolius* has since been loaded for an Eastern voyage, which is the service she was intended for, and further operating results will be looked for with great interest.

Three-Cylinder Turbine Geared to Propeller Shaft

Power, 24 June, 1924.—A turbine unit, as in the figure, consisting of a high, intermediate and a low-pressure element each connected by its individual pinion to a single gear, drives each of the two propeller shafts of the steamship *Orama* as described in the May 23, 1924, issue of *The Engineer* (London). Each turbine is a Parsons type and develops 10,000 shaft horsepower, with the component elements operating at 1,370 r.p.m., giving propeller speed of 95 r.p.m. Two rows of velocity compound blading are used on both the high-pressure and intermediate units, while the low-pressure is a straight reaction type. Reversing wheels are built into the intermediate and low-pressure elements. The power available in the reverse direction equals seventy per cent of that when going ahead.

The turbines are joined to the double helical pinion shafts by flexible couplings. The main thrust block is of the Michell type. It will be noted that an auxiliary gear wheel is placed at the end of a mainshaft near the coupling, which is for the purpose of turning the shaft over by means



The Engineer, London

HIGH, INTERMEDIATE AND LOW-PRESSURE TURBINES ARE GEARED TO PROPELLER SHAFT, SITUATED RESPECTIVELY AT THE TOP, THE NEAR AND FAR SIDES

of an electrical motor as required for purposes of adjustment and erection. The high-pressure element is placed at the top as in the figure, with an intermediate on one side and a low on the other. Steam is supplied at 215 pounds, 150 degrees F. superheat.

AERONAUTICS

Maughan Spans Continent Between Dawn and Dusk

Aviation, 30 June, 1924.—Lieutenant Russell L. Maughan, A.S., wrote a new page into the annals of aviation on June 23, when in a Curtiss Pursuit plane he successfully achieved the dawn to dusk flight from New York to San Francisco which he twice failed to accomplish last summer. The 1922 Pulitzer Trophy winner covered the 2700 miles from Mitchel Field to Crissy Field in a total elapsed time of twenty-one hours forty-four minutes and in a total flying time of seventeen hours fifty-two minutes.

The original schedule of the flight called for five hops of from 500 to 570 miles in length. Maughan on his flight cut one of these hops in two, so that the flight was made in six hops as follows: From Mitchel Field to McCook Field, Dayton, Ohio, 570 miles; From McCook Field to St. Joseph, Mo., 570 miles; from St. Joseph to North Platte, Neb., 325 miles; from North Platte to Cheyenne, Wyo., 215 miles; from Cheyenne to Salduro, Utah, 500 miles; from Salduro to San Francisco, 520 miles.

Considering the distance between New York and San Francisco, and also the prevalence of head winds when flying westward, the success of such a venture depends not only upon the flawless functioning of a high speed airplane but also upon the longest possible daylight and almost perfect weather conditions. The failure of one of these factors is sufficient to jeopardize the outcome, as Maughan learned to his regret last year.

But this year everything worked perfectly, although the weather at first balked Maughan's efforts for three days. He had intended to make the flight on June 20, the one but longest day of the year, so that should the weather be unfavorable he could still count on three or four really long

days. It was a wise precaution, for the weather was unfavorable for three days in succession, and the outlook seemed dark indeed. Then, late on June 22, weather reports all along the route indicated almost ideal conditions, and Maughan decided he would hop off at daybreak.

The first streaks of dawn were filtering over Mitchel Field when Maughan's Curtiss Pursuit plane was wheeled out of the hangar to the starting line. Maughan climbed in, equipped with a parachute, warmed up the engine, and was off in a mighty roar of his *D12* at three A. M. E.S.T. At seven A. M. he landed at McCook Field, where he was delayed over an hour when the handling crew broke the engine starter, but he was off again at 8:16. St. Joseph, Mo., saw him land in fine spirits at 10:52 A. M. C.S.T., after carefully circling over the field, for it had rained there the night before. He reported excellent weather all along the line, asked for some cold chicken and a glass of milk, got it, and hopped off at 11:37 o'clock. At 1:34 P. M. he stopped at North Platte to take on gasoline, took off again at 1:57, and landed at Cheyenne at 2:17 M.T. There he complained of nausea due to severe nervous strain, but he quickly recovered and was off at 2:54. He reached Salduro, Utah, at 5:20 P.T. feeling fine again and announcing that he had made his last stop. His prediction proved true, for having left Salduro at 5:51, he landed at Crissy Field, San Francisco, at 9:44 P.T. He was lifted from the cockpit by his cheering brother officers of the Air Service and carried on their shoulders to headquarters through a huge crowd of wildly excited spectators.

The dawn to dusk flight was undertaken by the Air Service to show the public the speed at which pursuit squadrons can be rushed from coast to coast in a war emergency, provided they are equipped with up-to-date planes. Lieutenant Maughan's splendid flight also serves as a reminder of the fact that the Air Service only has twenty-five ships of the type on which he spanned the continent in twenty-one and three-fourth hours elapsed time and at an average flying speed of approximately 150 miles an hour.

Army and Navy Departments Approve New Joint Air Service Policy

Army and Navy Journal, 5 July, 1924.—A new policy of the Army and Navy relative to Aircraft, and a revised precept for the Joint Aeronautical Board, has been approved by the Secretary of the Navy. This policy, according to the official announcement made June 28, is as follows:

The following order supersedes the existing precept of the Aeronautical Board:

In order to prevent duplication of effort and to secure a more complete measure of co-operation and co-ordination in the development and employment of the Army Air Service and Naval Aviation, the Secretary of War and the Secretary of the Navy have agreed upon the reorganization of the Aeronautical Board with functions, memberships, and procedure as follows:

1. The Aeronautical Board will investigate, study, and report upon all questions affecting jointly the development and employment of the Army Air Service and Naval Aviation referred to it by the Secretary of War, by the Secretary of the Navy, or by the joint board. It will also be charged with the duty of originating consideration of such subjects when, in its judgment, it is necessary, and of recommending whatever it considers essential to establish sufficiency and efficiency of co-operation and co-ordination of effort between the Army Air Service and Naval Aviation.

2. In the execution of the foregoing, the following will govern:

(a) All recommendations of the Aeronautical Board affecting joint policies or joint plans for the tactical or strategical employment of air-

craft or for the location of air stations, will be addressed to the Joint Board for consideration and recommendation to the Secretary of War and the Secretary of the Navy.

(b) The Aeronautical Board will formulate and submit to the Joint Board for approval suitable joint Army and Navy aircraft problems to be carried out each year.

(c) The Chief of Air Service of the Army and the Chief of the Bureau of Aeronautics of the Navy will submit to the Aeronautical Board all questions which concern jointly the Army Air Service and Naval Aviation.

(d) The development of new types of aircraft, aircraft motors and aircraft accessories, or of weapons to be used from aircraft, will, so far as practicable, be assigned to the Army or Navy and shall be carried on only by the Service to which assigned. This restriction will not prevent the employment by either the Army or Navy of any types of aircraft or weapons which, after development, are considered to be necessary for the accomplishment of its functions. Questions relating to the development of new types of aircraft, aircraft motors and accessories or weapons to be used from aircraft will be referred to The Aeronautical Board for recommendation as to whether the Army or Navy shall be charged with the development.

(e) Whenever possible, training, repair and other aviation facilities of either the Army or Navy will be made available for or be used by the other service.

3. The Aeronautical Board is specifically charged with the following:

(a) Plans to prevent competition in the procurement of material. Before arranging to purchase aircraft, each Service will ascertain whether aircraft of the type desired can be obtained from other Service. Joint plans for procurement of material in time of war will be submitted to the Joint Munitions Board.

(b) Consideration and recommendation of all projects for experimental stations on shore, for coastal air stations, and for stations to be used jointly by the Army and Navy, or for extensive additions thereto.

(c) Consideration of and recommendation in regard to all estimates of appropriations for the aeronautical programs of the Army and Navy before such estimates are submitted to Congress.

(d) Co-ordination of the activities of the Army Air Service and Naval Aviation in the purchase of material abroad and co-ordination of their activities with aeronautical activities of other branches of the government and with the civilian aeronautical organizations.

(e) Recommendations as to action to be taken on invitations of foreign governments to participate in aviation activities abroad and on the invitations of civilian organizations to participate in such activities in the United States.

(f) Cognizance of the issuing of licenses to civilians to operate aircraft in time of war.

4. The membership of the Aeronautical Board will consist of:

(a) *For the Army:* The chief of the Air Service, the chief of Training and War Plans Division, Office, chief of Air Service; one member of the War Plans Division, General Staff, War Department, to be designated by the chief of Staff of the Army. The last named member, while holding such office, will not be eligible for duty with the Joint Board or the Joint Planning Committee.

(b) *For the Navy:* The chief of the Bureau of Aeronautics: the chief of Planning Division, Bureau of Aeronautics, one member of the War Plans Division, Office of the chief of Naval Operations. The last named member while holding such office will not be eligible for duty with the Joint Board or Joint Planning Committee.

5. The secretary of the board will be selected by the Secretary of War and the Secretary of the Navy, from the permanent personnel of either Department and detailed to this duty.

6. The Aeronautical Board will hold regular monthly sessions and such extraordinary meetings as may be deemed advisable. The board will prescribe its procedure. The senior member of the board present will preside at its meetings. The reports and correspondence of the board will be authenticated by the senior officer of the Army and the senior officer of the Navy present at the meeting at which the action was taken.

JOHN W. WEEKS, *Secretary of War.*
CURTIS D. WILBUR, *Secretary of the Navy.*

By the action of the Secretary of War and the Secretary of the Navy, Jarvis Butler, the Secretary of the Joint Board, has been appointed Secretary of the Aeronautical Board.

Equipment Required for High Altitude Flying

By Paul B. King and Thomas Carroll, *Aviation*, 23 June, 1924.—Early in the flight work incidental to the development of supercharged engines at the Committee's Laboratory at Langley Field, we were somewhat astonished to find that the information concerning this branch of flying was very meager. As our experience developed, we were further surprised to find that even this fragmentary information was unreliable; that it was apparently collected rather for its news value than for its value as scientific data.

The effect of high altitude or low atmospheric pressure upon the operation of an engine was theoretically well known. The effect of the low pressure and lack of oxygen, and of the very low temperatures upon the pilot and likewise upon the performance of the airplane itself was not so well known. There was also a divergence of opinion concerning the use of oxygen apparatus according to the previous experience of American and British practice.

The use or abuse of the oxygen equipment appears to have the greatest influence upon the physical comfort and efficiency of the pilot while engaged in flights above 15,000 feet. We consequently will mention that important feature first.

It is of the greatest importance that the oxygen should be of the purest grade and thoroughly dried. The drying is important because moisture may collect in the tubes or valves and is apt to freeze, causing a stoppage. Care should be taken that oil is excluded from all internal parts of the apparatus as the presence of even a minute quantity of oil, if inhaled, is nauseating.

Automatic oxygen control we learned to have been unsatisfactory and we have never attempted its use. The simple manual control which we adopted has always functioned perfectly and we have never contemplated a change. This consists of a conventional hookup of five bottles, each of three liter capacity and under 1500-lb. pressure, connected to a common header with a single lead to a high pressure gage and a manually operated reducing valve. This valve is of a type in common use with oxyacetyelene welding outfits. From the valve a lead is carried to a flow meter graduated in "liters per minute" and thence directly by a rubber tube to the face mask. The mask is of rubberized fabric, fur lined about the edging, covering the entire face from the bridge of the nose down to well under the chin. The intake is through a tube just over the nostrils and at the chin there is a simple rubber flap exhaust valve. The sixth oxygen bottle is provided for emergency use controlled only by the bottle valve and having another rubber tube attached.

A difference of opinion exists as to the proper altitude to begin the use of oxygen. We believe that it should be taken immediately the slightest need is felt, and in ordinary cases preferably at and above 15,000 feet and certainly not later than 18,000 feet. No advantage can be gained by delaying its use as such delay can only accomplish a drain upon the body reserve inducing fatigue both during and following the flight.

Concerning the amount of oxygen to be taken as indicated by the flowmeter, we suggest that from 2.7 to 3 liters per minute be used up to 25,000 feet, gradually increasing above that altitude to 3½ or 4 liters per minute with a possible maximum of 4½ liters at 35,000 feet. The individual must determine for himself what the requirements of his system are; the foregoing is merely a guide indicated from our experience as the normal requirement. The effects of too little oxygen will be immediately distinguished in dizziness, drowsiness and impaired vision. Of too great an amount the effects will unfortunately not be noticed until a day or two later when it will be evidenced by sore lungs.

In descending it will be best to continue the use of oxygen to a fairly low altitude; we would recommend to 10,000 feet. This will alleviate the uncomfortable feeling and deafness usually accompanying the descent. On the descent a decrease in the flow rate should be made corresponding to the increase in rate on the climb as indicated by the flowmeter.

In the operation of the control valve it will be noted that as the altitude increases, and due to the drop in external pressure, the flow will tend to increase at too rapid a rate and this must be checked by a manipulation of the valve. On the descent the contrariwise will be found.

We have noticed that the best work can be done more comfortably when a heavy diet and any appreciable amount of liquids are refrained from on the day of the flight.

As to the effects of the extreme cold we have but little trouble. A fur-lined leather flying suit together with fleece-lined moccasins of the usual Air Service style constituted the clothing equipment used. These were not of the electrically heated type, nor was the necessity for such heating felt. The ordinary fur-lined helmet was augmented by an additional helmet, somewhat larger, fitted over the first. Gauntlet gloves of the type having the index finger separate and the remaining three fingers in one were used because it was necessary for the pilot to write observation data during the flights. A chamois face mask was tried but was discarded as unnecessary since the oxygen mask covered all of the lower face comfortably. Gogglettes No. 6 were used and were quite satisfactory although a second pair was carried in the event of fogging and freezing. Part of the ordinary clothing was discarded and a suit of very heavy silk underwear substituted. This added warmth and was less bulky. Two pairs of heavy woolen socks were worn without shoes other than the moccasins. This outfit was found to be quite satisfactory and no discomfort was felt with the exception of the fingers. Ordinarily, were it not required to use the hands other than in piloting, a heavy double mitten would be preferable. We are now attempting the use of electrically heated grips on the controls but since the work is temporarily stopped during changes in the equipment we cannot report their efficacy.

It is obviously wiser to refrain from any physical exertion particularly during the warm weather just prior to the flight, since if the body is damp with perspiration the effect of the low temperature will be the greater. It is better to wait until the body has cooled and damp clothing is removed if necessary.

We have experienced no after-effects from this nature of work nor

from the use of oxygen. There has been no extraordinary fatigue following any flight, and the same pilot has many times made other flights of more ordinary character within a few hours after the completion of a high altitude flight. Even two of these flights have been made on the same day and a number have been made on successive days without deleterious effect. Immediately following a number of these flights, the pilot involved has submitted to a physical examination by a physician and no after-effect has been noted.

Likewise, we have been unable to note any effect upon the system due to the low atmospheric pressure, at least none that is corrected by the proper use of oxygen. In fact, we would impress the point that the proper and careful use of oxygen eliminates all of the unpleasant and unusual elements of the work. Most of the uncomfortable feeling is occasioned from psychological causes rather than physiological. Even the pilot of experience is prone to favor his imagination in the monotony and lonesomeness of high altitude flights. Peculiarly, even this difficulty is remedied by the proper use of oxygen.

We believe that the foregoing encompasses all the hazards together with their remedies so far as the effect upon the physical condition of the pilot is concerned.

Of the airplane itself we have found that the low temperature has annoying effect upon the interplane and control wires due to their contraction, and upon the control bearing surfaces due to coagulation of the lubricant. Our remedy for this was to rig the wires loosely and to thoroughly clean the bearings and use a very thin oil.

The behavior of the airplane in the rarefied atmosphere of 30,000 feet and above is quite normal. Stalling and the recovery from the stall, so far as we can observe, is the same as at lower altitudes.

We have encountered no prevailing wind of high velocity, estimating the maximum at sixty miles an hour and the average in the neighborhood of forty miles an hour. Our greatest worry in regard to the prevailing wind is a condition that would probably only exist on the east coast. That is, that since the prevailing wind is from west to east, that a parachute descent would undoubtedly carry one out to sea unless the flight is carried well inland.

In general we now feel that there is no reason why this work may not be taken up without the timidity or anxiety to which we must confess in our initial attempts. We trust that this information will be of value to those who in the future will enter this work as a new field.

Success of Water Recovery Apparatus

Army and Navy Register, 28 June, 1924.—A recent report to the Bureau of Aeronautics, Navy Department, from the naval air station at Lakehurst, N. J., states that the "water recovery" apparatus, installed on one of the engines of the airship *Shenandoah* prior to the flight made by the airship to Albany and Buffalo on June 3 and 4, exceeded all expectations in its operation during the flight. This apparatus condenses the water present in the engine exhaust gases, the water thus recovered compensating for the weight of the gasoline burned. Experiments with the apparatus before it was actually installed on the airship indicated that a recovery of water equal in weight to the fuel burned could be expected. On the Albany flight, the first time that actual use of this device was made on an airship, these expectations were exceeded, and one hundred pounds of water were obtained for every ninety pounds of fuel expended by the engine fitted with the system. The use of the water recovery apparatus

on a rigid airship, such as the U. S. S. *Shenandoah*, has two very important advantages. In the first place, by compensating for the weight of fuel used, the weight of the airship is maintained more nearly the same. This makes possible a much greater cruising radius, as without the apparatus, when the airship becomes light through expenditure of fuel, a portion of the inflating gas, helium, must be released, or "valved," in order to keep the buoyancy of the airship the same. This loss of helium decreases the cruising radius of the airship.

The value of the helium saved by the use of this device, in dollars and cents, is very considerable, its use making for more economical operation. Only one water recovery unit was on board the *Shenandoah* during the New York state flight, and while some helium had to be released when it was desired to land the airship at the conclusion of the flight, the weight of the water obtained by the recovery unit kept this amount of helium down to a minimum. Since the flight of June 3 two additional units have been placed on the airship, and will undoubtedly result in still greater economies in the operations of the airship in the near future. After the airship has been tested with the three units installed on three of the airships' five engines, and questions of air resistance have been worked out, it is planned to place water recovery units on all five of the engines. With this installation complete, the airship will be able to operate with an economy of helium never before possible. It will be possible to keep the same gas in the airship for long periods, until it becomes contaminated through long use. When this condition is reached, the gas is removed from the airship, repurified in a plant for the purpose now in operation at the naval air station at Lakehurst and used over again. The combination of the water recovery units and the repurification plant makes it possible to use the same gas over and over again.

Another interesting angle to the use of water recovery apparatus on the airship *Shenandoah* is that besides being available for ballast, the water recovered is suitable for use in the radiators of the engines, may be used for washing, and if necessary is potable. In this respect the apparatus is analogous to a water distilling plant used on board ships at sea.

U. S. Entries Lead Helicopter List

Washington *Post*, 13 July, 1924.—London, July 12.—The United States heads the list of entries for the British Air Ministry's helicopter competition with nine different machines, Great Britain coming second with four. France, Belgium and Italy have each entered one.

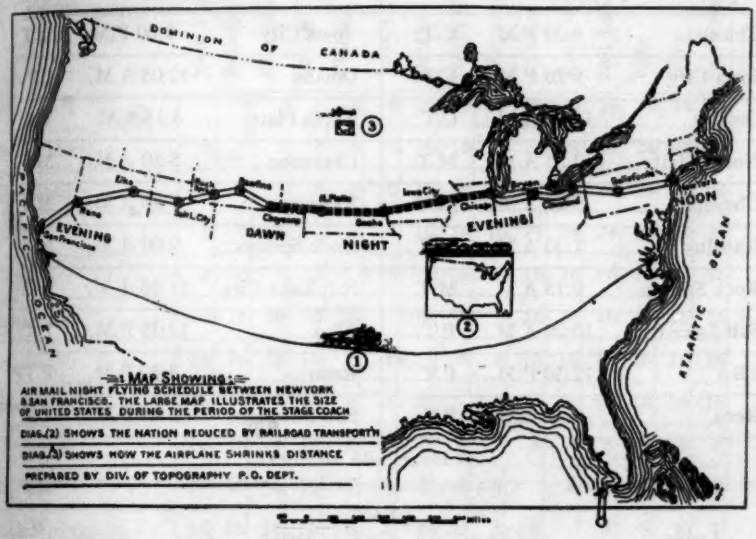
The ministry received nineteen entries in all, of which, however, only the above sixteen were definitely accepted and it is surmised that some of these will not be ready for the tests by April 30, 1925, when the competition closes.

The entrants may test the machines at the government's aircraft center at Farnborough from August 1 onward, before a judging committee consisting of experts appointed by the air ministry. Each machine must carry a pilot, one hour's fuel and a military load of 150 pounds.

It is required, to win the ministry's prize of £50,000, that a machine shall accomplish a straight up-and-down flight, attaining an altitude of 2,000 feet, a hovering flight of half an hour, a circular flight of twenty miles at sixty miles an hour, and descent into a small area from 300 feet, with the engine stopped. Ascents and descents must be performed in a calm and in a wind not to exceed twenty-five miles an hour.

One-and-a-Half Day Coast to Coast Air Mail

Aviation, 30 June, 1924.—Inauguration on July 1 of the one-and-a-half day Air Mail Service between New York and San Francisco will form the culmination of carefully laid plans for this great enterprise, which was experimentally tested last summer for four days in succession. The practicability of the scheme having been indicated by these tests, and Congress having since appropriated the necessary funds for running such a


DOMINION OF CANADA
PACIFIC OCEAN
EVENING
DAWN
NIGHT
EVENING
ATLANTIC OCEAN
MAP SHOWING:—
AIR MAIL NIGHT FLYING SCHEDULE BETWEEN NEW YORK & SAN FRANCISCO. THE LARGE MAP ILLUSTRATES THE SIZE OF UNITED STATES DURING THE PERIOD OF THE STAGE COACH
DIAG.(2) SHOWS THE NATION REDUCED BY RAILROAD TRANSPORTN
DIAG.(3) SHOWS HOW THE AIRPLANE SHRINKS DISTANCE
PREPARED BY DIV. OF TOPOGRAPHY P.O. DEPT.

MAP SHOWING THE TRANSCONTINENTAL AIR MAIL ROUTE AND ONE AND A HALF DAY SCHEDULE

service all the year round, only detail work remained to be done to carry out the plan.

The map of the transcontinental mail airway which is shown above, indicates the stopping points of the service and the subdivision of the route into day and night flying sections.

SUMMER SCHEDULE

WEST

Leave			Arrive		
New York	10:00 A.M.	E.T.	Bellefonte	12:20 P.M.	E.T.
Bellefonte	12:40 P.M.	E.T.	Cleveland	2:55 P.M.	E.T.
Cleveland	3:10 P.M.	E.T.	Bryan	3:55 P.M.	C.T.
Bryan	4:15 P.M.	C.T.	Chicago	6:15 P.M.	C.T.
Chicago	6:30 P.M.	C.T.	Iowa City	9:00 P.M.	C.T.
Iowa City	9:20 P.M.	C.T.	Omaha	12:05 A.M.	C.T.
Omaha	12:20 A.M.	C.T.	North Platte	3:15 A.M.	C.T.
North Platte	2:35 A.M.	M.T.	Cheyenne	5:10 A.M.	M.T.
Cheyenne	5:25 A.M.	M.T.	Rawlins	7:10 A.M.	M.T.
Rawlins	7:30 A.M.	M.T.	Rock Springs	9:00 A.M.	M.T.
Rock Springs	9:15 A.M.	M.T.	Salt Lake City	11:05 A.M.	M.T.
Salt Lake City	10:20 A.M.	P.T.	Elko	12:35 P.M.	P.T.
Elko	12:50 P.M.	P.T.	Reno	3:30 P.M.	P.T.
Reno	3:45 P.M.	P.T.	San Francisco	5:45 P.M.	P.T.

34 Hours—45 Minutes

EAST

Leave			Arrive		
San Francisco	6:00 A.M.	P.T.	Reno	8:00 A.M.	P.T.
Reno	8:15 A.M.	P.T.	Elko	10:45 A.M.	P.T.
Elko	11:00 A.M.	P.T.	Salt Lake City	1:00 P.M.	P.T.
Salt Lake City	2:15 P.M.	M.T.	Rock Springs	4:00 P.M.	M.T.
Rock Springs	4:15 P.M.	M.T.	Cheyenne	7:00 P.M.	M.T.
Cheyenne	7:15 P.M.	M.T.	North Platte	9:45 P.M.	M.T.
North Platte	11:05 P.M.	C.T.	Omaha	1:50 A.M.	C.T.
Omaha	2:05 A.M.	C.T.	Iowa City	4:50 A.M.	C.T.
Iowa City	5:10 A.M.	C.T.	Chicago	7:20 A.M.	C.T.
Chicago	7:35 A.M.	C.T.	Bryan	9:25 A.M.	C.T.
Bryan	9:45 A.M.	C.T.	Cleveland	12:20 P.M.	E.T.
Cleveland	12:35 P.M.	E.T.	Bellefonte	2:35 P.M.	E.T.
Bellefonte	2:55 P.M.	E.T.	New York	5:05 P.M.	E.T.

32 Hours—5 Minutes

RATES OF POSTAGE

BETWEEN	New York	Bellefonte	Cleveland	Bryan	Chicago	Iowa City	Omaha	North Platte	Cheyenne	Rawlins	Rock Springs	Salt Lake City	Elko	Reno	San Francisco
New York		8	8	8	8	16	16	16	16	24	24	24	24	24	24
Bellefonte	8		8	8	8	16	16	16	16	24	24	24	24	24	24
Cleveland	8	8		8	8	16	16	16	16	24	24	24	24	24	24
Bryan	8	8	8		8	16	16	16	16	24	24	24	24	24	24
Chicago	8	8	8	8		8	8	8	8	16	16	16	16	16	16
Iowa City	16	16	16	16	8		8	8	8	16	16	16	16	16	16
Omaha	16	16	16	16	8	8		8	8	16	16	16	16	16	16
North Platte	16	16	16	16	8	8	8		8	16	16	16	16	16	16
Cheyenne	16	16	16	16	8	8	8	8		8	8	8	8	8	8
Rawlins	16	16	16	16	8	8	8	8	8		8	8	8	8	8
Rock Springs	16	16	16	16	8	8	8	8	8	8		8	8	8	8
Salt Lake City	24	24	24	24	16	16	16	16	8	8	8		8	8	8
Elko	24	24	24	24	16	16	16	16	8	8	8	8		8	8
Reno	24	24	24	24	16	16	16	16	8	8	8	8	8		8
San Francisco	24	24	24	24	16	16	16	16	8	8	8	8	8	8	

At such cities as show an arrival late in the day by the Air Mail Schedule the use of special delivery stamps in addition to the zone postage will insure delivery on the date of receipt.

Postage eight cents an ounce, or fraction thereof, for each zone, or part of zone, in which mail is carried by plane. Transit mail forwarded to destination by Railway Mail Service will be rated to point carried by Air Mail Service.

ORDNANCE

Higher Gun Reach Navy's Great Need

By Cyril Morand, The Los Angeles *Examiner*, 6 July, 1924.—The passage of the so-called 5-5-2 Navy Bill by Congress without provision for gun elevation in certain battleships has been characterized in many quarters as gravely crippling the fighting efficiency of the American battle fleet. Though the bill failed in the rush incident to congressional adjournment, none the less the attitude of both houses in ignoring urgent naval representations in this all-important item is held a serious obstacle in achieving the naval parity assigned to the United States at the Limitation of Arms Conference.

One of the most important factors in the gun elevation question, that of "gun-reach" for a slow fleet, was virtually untouched, so far as I can learn, in Congress and in press notices of the bill's consideration.

In light of the above, a brief review of this protracted controversy, with some estimate of the loss resultant from the refusal of the measure, should not be without interest. Gun reach, the desirability not necessarily of great ranges, but of a widely adaptable offensive power, is developed in an elementary way in this discussion. It is the real basis, agree many officers with whom I have talked, for urging alterations of our older ships.

Gun elevation, in a word, is an effort by the navy to make good deficiencies incurred by our sacrifices at the Arms Conference. At that time, it will be remembered, the United States abandoned six battle cruisers of high speed and heavy gun power, all well along toward completion, together with six battleships of like size, embodying improvements dictated by war experience. In the completion of these all the predreadnaughts and several early dreadnaught classes would automatically have gone into the discard, with no place in what would have been the most powerful battle fleet the world has been. These ships, however, with their great military advantage, were tossed away in a splendid gesture of idealism and good will; some have called it politics, some folly. Their abandonment marked the death of the "1916 program." To maintain the ship tonnage ratio assigned at the conference we were necessarily left with several old-type ships that, in the light of post-Jutland design, would otherwise have been discarded, conference or not. These ships, the status quo at the treaty ratification, must serve for ten years irrespective of their age or fighting value. No further ships, to correct mistakes or retrieve errors, may be built by us within this period.

With the exception of our newest units, the three *Colorados* and two *Californias*, American battleships have a maximum gun elevation of fifteen degrees in the main batteries, limiting considerably the effectiveness of their gunfire. The elevation controversy has raged in Congress chiefly on a basis comparative with the gun ranges of the British fleet. Eliminating such non-essentials as whether or not we are to consider the British potential enemies, or the Japanese, or anyone else, the issue is simply a national responsibility to place our naval defense on as efficient a basis per ton-gun as possible.

At the time money was actually appropriated by Congress for the work, in 1922, legislation is said to have been based on erroneous reports of the British improving older ships left to them at the conference. On their embassy's representations at Washington, the reports were subsequently retracted and the appropriation withheld. Just what Great Britain or any foreign power has to do with making the best of our fleet under the limitation of the treaty is a mystery to naval officers, all of whom are keenly sensible of the disadvantage under which the American battle fleet would enter a naval engagement today.

Briefly the situation is this: Extreme ranges of the future, 30,000 yards

and above, can only be fought with highly developed aircraft spotting and fire control.

This assumes complete air organization at sea, with fighting planes for the defense of observers, aircraft, carriers and in addition thoroughly reliable radio communication from the spotting planes to firing ships. Also but a small percentage of any fleet today could engage at this range. The United States with a fleet of eighteen capital ships could employ five with an aggregate broadside of twenty-four 16-inch and twenty-four 14-inch guns. The British will oppose to this three of a fleet of twenty units with a total of eighteen 16-inch and eight 15-inch guns.

On the subject a British naval authority has this to say: "At 30,000 yards and above the American fleet could develop a preponderance of fire . . . but at anything under this distance the British ships would have the best of it, as all of them could use their guns up to 25,000 or 26,000 yards, whereas very few American vessels could shoot farther than 23,000 yards."

The British, as a matter of information, have seventeen ships with a maximum elevation of twenty degrees and three with thirty degrees, in the twenty ships of their treaty fleet. It is obvious that with a superior fleet speed the British admiral (or any other) would close the range to a point where most of the ships told and the least of the enemy's and utilizing that superiority, maintain his favorable position by maneuver until he had obtained decisive advantage and victory.

So far as can be reasonably predicted, effective battle ranges in the discernible future will hardly exceed 25,000 or 26,000 yards. This is not due to any limitations of ordnance, but to the pure physical capabilities of the human eye, of aircraft gun sighting and range finding.

The comparative table of available power of the United States, the British and Japanese fleets shows that with ten capital ships to our eighteen, Japan would be able in a fleet action to pit 100 per cent of her strength against little more than fifty per cent of ours; the British effective strength would likewise be 100 per cent, twenty ships. The ratio at this range would then be 2-1-1 instead of the 5-5-3 as provided by the treaty. This is coupled with the immense tactical advantage of superior speed in both British and Japanese fleets that there is little reason to assume their commanders would not fully employ. And, though I am basing these presumptions upon an "arbitrary range," let me stress again that the choice of distance rests with the fastest fleet.

The fleet engagement of the future, as deduced from the history of modern navies, will be generally a beam-to-beam, broadside action on approximately parallel courses. This conviction is reflected in the design of capital ships, everything aiming toward a maximum weight of broadside fire, with accurate fire control a good percentage of target hits may be counted on in battle. Consequently, in an engagement of any duration whatever the ships of both fleets, however vitally unimpaired, will suffer injury. This may take the form of superstructure demolition and very probably hull damage. If hull damage it will manifestly be on the engaged side, that is, the side toward the enemy, and the admission of water will naturally result in a list of the ship toward the target.

This list will lower the effective elevation of the guns with reference to the target. While in no way, possibly, affecting the general safety of the vessel or her theoretical fighting value, such a casualty, even at moderate ranges, may deprive the fleet of the fire of that ship, owing to its inability to reach the target.

This point may be challenged in view of the provision in modern warships for maintaining trim by flooding compartments on the opposite side of the ship from that injured. In that case I wish to submit that the taking of water sufficient to counteract that causing the list would involve an increase of draft, materially reducing the ship's speed.

Inasmuch as the American fleet is slower than that of any possible competitor, our ships throughout an engagement would be always at a higher duty percentage and a consequent lower reserve of motive power than their antagonists.

It is to be questioned if the American commander could afford the reduction in speed entailed in recovering trim of a damaged ship. It would involve the slowing up of the whole fleet or the loss of the crippled one's place in the battle line, and unless the maneuver were abandoned to his support, almost certain destruction by unengaged enemy units and torpedo attack. To the admiral commanding our slow fleet, the maintenance of trim in a damaged American unit would be a decision made only in the gravest necessity. Hull penetration that might be a minor casualty in an antagonist —because of the higher reach of his guns—would be fraught with the most serious consequences in an American ship.

Two of our older units, the *Arkansas* and *Wyoming,* are equipped with twelve-inch 50-caliber rifles, and though of only fifteen degrees elevation, a high muzzle velocity (2950 fs.) gives them an extreme range of 24,500 yards.

The increase of gun elevation might properly be concentrated in the six earlier fourteen-inch gun ships, instead of in thirteen as the item in the 5-5-3 navy bill called for. These six ships are fitted with a low velocity, .45-caliber guns. This gun, with a muzzle energy of 2,600 fs., has a range at fifteen degrees elevation, 2000 yards less than the *Florida* and *Utah,* the oldest and weakest units of the fleet. The latter's twelve-inch guns have a range at fifteen degrees of 22,000 yards. It is most necessary that these six comparatively new and powerful units, the *Arizona, Pennsylvania, Oklahoma, Nevada, New York* and *Texas,* be equipped for a higher elevation. It will materially increase the utility of the ships and, more than the increase of range afforded, will multiply the conditions of battle under which they will be serviceable.

In the handicap of a slower tactical fleet, which must ever present a problem to the American commander, the necessity for high angle guns more than counteracts incidental disadvantages such as increased port openings, weakening of turret face armor and a slight decrease in rate of fire. Chairman Butler of the Naval Affairs Committee of the House opposed the appropriation for this work on the ground that it was not comformable to the tenets of the Disarmament Conference. On the contrary, the increase of the gun elevation on American ships would violate neither the letter nor the spirit of the agreement, the clause touching this point merely prohibiting "alterations in caliber, number and general type of main armament." Certainly the measure cannot be construed as a violation of this clause.

While thirteen ships were mentioned in the bill, and it would be well if all were included, the imperative need is for the change of the ships listed above. The three *New Mexicos,* while having a range of 24,000 yards, still have the unfavorable practical restrictions imposed by the fifteen degree elevation of their guns.

The dispositions of the future naval battle are somewhat a matter of conjecture. Opportunities of a novel sort must arise and be seized; they will be opposed or enhanced perhaps by inventions of which we now have no conception. But based on lessons of the past and on our grasp of the trends and material of the present, we cannot be blinded to the extraordinary necessity of widely adaptable gun power in a technically slow fleet, such as that of the United States.

A table on this page shows relative ranges of British and American ships. Detail figures on Japanese ranges are unfortunately not available, but in the general excellence of their ships we may assume that their guns of a corresponding bore and caliber to be in no way inferior to American and British weapons; the Island power has often been said to minimize

rather than to exaggerate the performance of their war material. None of her treaty fleet is believed to have main battery elevation less than twenty degrees.

It is to be hoped that further efforts of the Navy in the next Congress to achieve this necessary improvement will find a kindlier and more reasonable ear, and, in making an actual approach to the fulfillment of the 5-5-3 ratio, attain an added battle efficiency all out of proportion to the cost.

HOW NAVY GUNS COMPARE

Relative Ranges of British and American Ships

Name	Yr. Built	Displ. Tons	Range Yds.	El. Deg.
Great Britain				
Hood	1920	41,200	30,500	30
Nelson	1925	35,000	32,000	30
Rodney	1925	35,000	32,000	30
Ramillies	1917	25,750	24,300	20
Royal Sovereign	1916	25,750	24,300	20
Royal Oak	1916	25,750	24,300	20
Resolution	1916	25,750	24,300	20
Revenge	1916	25,750	24,300	20
Valiant	1916	27,500	24,300	20
Malaya	1916	27,500	24,300	20
Queen Elizabeth	1915	27,500	24,300	20
Warspite	1915	27,500	24,300	20
Barham	1915	27,500	24,300	20
Benbow	1914	25,000	23,800	20
Emp. of India	1914	25,000	23,800	20
Iron Duke	1914	25,000	23,800	20
Marlborough	1914	25,000	23,800	20
Renown	1916	26,500	24,300	20
Repulse	1916	26,500	24,300	20
Tiger	1914	28,500	23,800	20
United States				
West Virginia	1923	32,600	34,000	30
Colorado	1923	32,600	34,000	30
Maryland	1922	32,600	34,000	30
California	1921	32,300	30,000	30
Tennessee	1920	32,300	30,000	30
Idaho	1919	32,000	24,000	15
New Mexico	1918	32,000	24,000	15
Mississippi	1917	32,000	24,000	15
Arizona	1916	31,400	21,000	15
Pennsylvania	1916	31,400	21,000	15
Oklahoma	1916	27,500	21,000	15
Nevada	1916	27,500	21,000	15
New York	1914	27,000	21,000	15
Texas	1914	27,000	21,000	15
Arkansas	1912	26,000	24,500	15
Wyoming	1912	26,000	24,500	15
Florida	1911	21,800	22,000	15
Utah	1911	21,800	22,000	15

RANGES OF THREE FLEETS

At an arbitrary range of 23-24,000 yards (almost fourteen miles) a comparison of the available power of the United States, the British and the Japanese fleets presents an interesting study:

EFFECTIVE FLEET FIRE AT 23-24,000 YARDS

	U. S.	*Gt. Britain	†Japan
No. effective ships	10	20	10
No. 16-inch guns	24	18	16
No. 15-inch guns	0	100	0
No. 14-inch guns	60	0	80
No. 13.5 inch guns	0	48	0
No. 12-inch guns	24	0	0
Total guns	108	166	96

*Superior fleet speed 2-9 knots.
†Superior fleet speed 2-6 knots.

Coast Defense and the Navy

Coast Artillery Journal, June, 1924.—From time to time someone suggests that the mission of the Navy might well be extended to include the defense of the coast line, which would involve the taking over by the Navy of our fortifications. Such persons fail to realize that the defense of our coast in time of war cannot be secured by our permanent fortifications only, but must be obtained by the combined effort of these strong points with large infantry forces; the permanent fortifications having the mission of denying our harbors to the enemy, and the infantry, with their supporting arms, that of preventing the enemy from securing a foothold on shore between the permanent fortifications. Such an organization requires that all units within the various sectors be subject to the will of the commanding officer of each sector, and this can only be secured when the units concerned have been trained together, have thought along the same lines, and have been guided by the same regulations. With some of the units of a sector from the Navy and others from the Army, try as hard as they would, misunderstandings would be sure to arise, and mistakes, perhaps costly, would be made. Furthermore, our harbor defenses consist not only of large guns in fixed emplacements, which an uninformed person naturally assumes are fired just as are guns on board ship, but in addition they include railway artillery, tractor-drawn artillery, and submarine mines of a type vastly different from those used by the Navy. The question was recently broached at one of the Military Affairs Committee meetings in Congress concerning which the *Army and Navy Register* has the following to say:

It is not expected that any congressional discussion of the Coast Artillery Corps in relation to coast defense will lead to a change in the existing situation. Those in Congress who have speculated upon the prospects of an improved condition by making the Coast Artillery a part of the Navy or by turning over the land fortifications to the naval establishment are plainly proceeding on imperfect information or no knowledge at all of the situation. More familiarity with the facts would show, to begin with, that are no *bitter complaints* entertained or expressed by Coast Artillery officers as protest against the sedentary career at a coast fort; that duty with the fixed guns of the harbor defenses is only a small part of the work which the Coast Artillery personnel is called upon to perform with such variations as service with antiaircraft, railway and heavy tractor artillery, to mention nothing more and to ignore detached service generally. The training is highly specialized, and, while the guns on shore are of much the same type as is naval ordnance—some of the big-caliber naval guns being installed on

the land fortifications—the methods of plotting and the system of fire control is altogether different. The problems, too, vastly differ, being perhaps more difficult in the case of the Navy, firing moving guns against moving targets, while the Army fires fixed guns against moving targets. The transfer of the coast fortifications to the Navy would result in many complications and the disturbance in the system of co-operation and co-ordination between the Coast Artillery and the supply branches of the Army, between which the closest relations prevail, to say nothing of a construction branch for the building of emplacements. As it is now, the Coast Artillery works in closest contact with the Navy in the preliminaries and the development of a joint protection of the coast, and there could be no improvement, declare those qualified to speak with authority, by any radical alteration in the relationship. Coast Artillery transfer to the Navy or naval personnel occupation and operation of the land fortifications would not, by any means, produce rotation in duty for the purpose of relieving the monotony of isolation, but would still find the fort personnel separated from the naval establishment just as is the Marine Corps. It is certain the War Department would oppose the project of transfer or of amalgamation if it ever reached that stage in the proceedings, and it is equally sure that the Navy Department would not support such a proposition. Even the commission that suggested many highly revolutionary consolidations in governmental organization, attempted no such flight in its erratic imagination.

Air Pressure is Blamed for Navy Disaster

Baltimore *Sun*, 16 July, 1924.—Washington, July 15.—The turret explosion aboard the battleship *Mississippi*, off the California coast last June 12, in which forty-four men and three officers were killed, resulted from insufficient air pressure used in cleaning the bore of the big gun, according to findings of the Naval Court of Inquiry.

The fire in the upper handling room, the court said in its findings announced today, was "caused by the safety doors not being entirely closed" and casualties were increased by the presence of unofficial observers "who crowded the passageways, making exits more difficult."

The court made no recommendations, its report being confined solely to findings of fact. Secretary Wilbur and his technical staff have taken the document under study to determine whether there should be further action.

Summarizing the report, the department gave the following as "facts" established by the court:

"At about 11:45 A. M., June 12, 1924, the U. S. S. *Mississippi* while firing Advanced Practice B, together with the *Tennessee* and *Idaho*, suffered a casualty in the right gun of No. 2 turret which resulted in the death of three officers and forty-four (or forty-five) men and the injury of nine other men. About four hours later the left gun of No. 2 turret was accidentally discharged and ten additional men were injured.

"The ten additional men appear to have been injured while standing outside the turret and by the blast of the gun. The entire turret's crew were killed with the exception of two men from the right gun, five men from the center gun and two men from the left gun by the original casualty. There were a number of observers, both official and unofficial in the turret, some of whom escaped.

"All who escaped did so by means of the exits into the lower handling room. The entrance doors underneath the overhang of the turret opened upward and apparently could not be opened in time to permit escape. Ensign Smith entered the turret by prying open one of the doors under the overhang about fifteen minutes after the casualty occurred. The gases were so thick that he was able to remain in the turret only a few minutes with a gas-mask on. He ascertained, however, that all men then in the turret were dead.

"The casualty in question occurred during the firing of the eighth salvo. Prior to that time, namely, upon the completion of the load for the third salvo, the left gun of No. 2 turret fired prematurely while the firing circuit was open and while the gun was in loading position. As the plug was closed, no damage was done.

"As described by eyewitnesses, the main casualty occurred as follows: The seventh salvo had been fired, guns returned to loading position and plug opened. There appeared to be some trouble with air pressure, although not very clear just what, except that the gun captain was heard to make some remarks about the air pressure; the turret captain picked up a wrench and stated he would fix it. The shell was rammed home, four bags of powder placed on the spanner tray and rammed into the gun, rammer withdrawn, whereupon there emerged from the breach of the gun a small grayish ball of smoke and flame followed by a large flash of flame. Flames and gases immediately filled the gun compartment, passed through the safety doors above the shell table to the other two gun compartments and through the peep doors to the turret officers' booth. Deaths occurred as the result of asphyxiation.

"The court was of the opinion that the premature firing of the left gun on the third salvo was due to 'foul bore,' consequent to insufficient air pressure and guns not being properly cleared of gas before loading.

"The court was of the opinion that the same cause resulted in the main casualty; the gun being fired into the wind probably made the expulsion of gases more difficult; that the number of casualties was increased by the presence of unofficial observers, who crowded the passageways, making exits more difficult; that the damage casualties on the left and center guns probably resulted by the failure to keep the safety doors over the shell table closed; that the fire in the upper handling room was caused by the safety doors not being entirely closed."

U. S. Navy Explosion Loss Total Slight

The answer to the question of "What is the matter with the United States Navy?" which has been asked frequently in the press since the turret explosion on the *Mississippi*, can be found in a comparison with the character and the number of accidents in the other navies of the world.

The American Navy has never lost a single ship by explosions in the past twenty years, which is the period in which high explosives have been developed. Its casualties are the lowest, the comparison being extended to Russia and Brazil. In several accidents Great Britain, Japan, France and Italy had more casualties than the aggregate of the American Navy in this period.

The total killed in such explosions in the United States Navy was 120 as compared with 2,318 for the British Navy, 1,529 for the Japanese, 633 for the Italian, 416 for the French, 216 for the Russian, and 212 for the Brazilian. The table printed below was hastily prepared and some of the accidents in other navies may not be included, but the list of explosions of the United States Navy is complete. The accident to the boiler of the gunboat *Bennington* and the battleship *Delaware* are not included in this list for the United States Navy, as only the ammunition explosions in other nation's navies are used in the comparison.

United States

The following is the list of explosions on warships of the United States:

Missouri—battleship—13,500 tons—turret explosion while off Guantanamo, Cuba, April 13, 1904—31 killed.

Kearsage—battleship—11,520 tons—turret explosion in Caribbean Sea, April 13, 1906—6 killed.

Georgia—battleship—14,948 tons—turret explosion off Cape Cod, Mass., July 15, 1907—6 killed.

Charleston—cruiser—9,700 tons—breech block of 6-inch gun blew out, March 28, 1910—8 killed.

Mississippi—battleship—32,000 tons—turret explosion—June 18, 1924—48 killed.

GREAT BRITAIN

Bulwark—battleship—15,00 tons—magazines blew up ship off Sheerness, November 26, 1914—738 killed.

Princess Irene—minelayer—Own mines blew up ship, May 27, 1915—400 killed.

Vanguard—dreadnaught—19,250 tons—magazines blew up ship, July 9, 1917—800 killed.

Natal—cruiser—13,550 tons—magazines blew up ship, December 31, 1918—380 killed.

Monitor—(Name not published—magazines blew up ship September 16, 1918).

(Note: No list of turret accidents located—must have been secret).

JAPAN

Milkasa—battleship—15,000 tons—magazines blew up ship September 12, 1905—599 killed.

Kashima—battleship—16,400 tons—turret explosion September 16, 1907—18 killed.

Matsushima—cruiser—4,210 tons—magazines blew up ship off Pescadores Islands, April 30, 1908—208 killed.

Tsukuba—Battlecruiser—14,000 tons—magazines blew up ship at Yokosuka, January 14, 1917—180 killed.

Kawachi—battleship—21,420 tons—magazines blew up ship in Tokeyama Bay during July 1918—500 killed.

Shikishima—battleship—15,200 tons—6-inch breech block blew out July 22, 1916—7 killed.

Hyuga—battleship—30,000 tons—turret explosion October 24, 1919—12 killed.

Haruna—battlecruiser—27,500 tons—turret explosion, September 12, 1920—5 killed.

FRANCE

Jena—battleship—(?) tons—explosion in magazine—118 killed.

Liberte—battleship—14,900 tons—magazines blew up ship, September 25, 1911—285 killed.

La Touch Trevillse—cruiser—(?) tons—turret explosion September 22, 1908—13 killed.

ITALY

Leonardo Da Vinci—battleship—24,500 tons—magazines blew up ship at Taranto, August 1916—248 killed.

Beneditto Brin—battleship—13,400 tons—magazines blew up ship at Brindisi, July 24, 1915—385 killed.

RUSSIA

Imperatritea Maria—battleship—24,000 tons—magazines blew up ship at Sebastapol, October 20, 1916—216 killed.

BRAZIL

Aquidaban—battleship—(?) tons—magazines blew up ship, January 21, 1906—212 killed.

NAVIGATION AND RADIO

New Earth Inductor Compass

Army and Navy Register, 5 July, 1924.—Announcement is made at the Department of Commerce of a new earth inductor compass, invented at the bureau of standards, which is said to have marked advantages over the usual types of ships' magnetic compasses. During a recent sea test it was found to be free from roll and pitch error to such an extent that it remained steady under conditions which caused the ship's compass to oscillate two or three degrees. When a sudden change of course was made, the indicator moved freely and without oscillation. It has a further advantage that the parts affected by the ship's magnetism can be placed in that part of the ship in which they will be least affected, up at the masthead if desired. The indicating instrument is unaffected by the ship's magnetism and can be placed at any convenient point. The two parts are connected by ordinary wires. This compass is the invention of Dr. L. J. Briggs and Dr. Paul R. Heyl, of the bureau of standards. It takes advantage of the fact that the voltage of a direct-current dynamo is changed by changing the angle between the field and the brushes. In the compass the earth's magnetic field replaces the field magnet of the dynamo, and the brushes are mounted on the ship and turn with it. The armature is driven by a small electric motor or may be driven by a wind wheel. This type of compass has already been tried out in airplanes, where it has proven satisfactory.

Coast Guard Ship "Bear" Ice-Locked in Arctic on Her Last Voyage North

Washington *Star*, 15 July, 1924.—The venerable Coast Guard cutter the *Bear* has made her last journey to the Arctic. She is pinched in the ice somewhere a thousand miles north of Unalaska, two propellers are broken, she has a score of dents in her sides, and Coast Guard headquarters has radioed orders to give up, to return home from the fiftieth annual cruise into the far north.

So "Healy's puk oomiak" will not take the mail and the messages from civilization to Point Barrow this year. The old vessel, named "Healy's fire canoe" by the natives when Captain Healy used to guide her into the northern wastes, no more will brighten the lives of those lost from the world for a year at a time. She has been branded unsafe, unseaworthy, and when she gets back to the states, if she does, she will be dismantled.

It was on May 2 that the *Bear*, in command of Captain Cochran, steamed away from the Golden Gate. Her skipper bore the usual broad instructions "to aid all people, to assist commerce, to open lines of communication," and last, but one of her most important duties, to carry the mails to every village not reached by the Bering sea patrol. The farthest north of these is Point Barrow.

Her thin stream of smoke and her white sails—for they use sails wherever possible to conserve stores of coal—eagerly have been watched for many long days each summer by the missionaries, the teachers, the traders and the natives, but their watches this time will be in vain in many villages.

A brief radio came through from Captain Cochran today. It told in a few words the story of a disappointed crew and insurmountable ice that blocked the northward way. Half a dozen times in June the *Bear* was caught in the ice. Men acquainted with the north, brawny and willing, freed her and sought another means of egress, but July 5 found her facing "heaviest ice," and a day later she was held fast again. When she was loose Captain Cochran was ready to start back.

Although Captain Cochran's last message indicated his belief that he would have little difficulty in returning as soon as the ice conditions permit, Rear Admiral Billard, the commandant, and others at Coast Guard headquarters fear that the old boat may not emerge safely. She should never have gone this year, they said, but Capt Cochran urged that the old Dundee whaler—the boat that had made forty-nine trips into waters that none other dare penetrate, including the journey to the rescue of Greely—should be given another trial.

Congress was asked at its last session to appropriate money for a new craft to replace the *Bear,* but the bill got lost in the jam of the closing days. Her sister ships, the *Thetis* and the Resolute, long ago were dismantled, but not until each had served the government faithfully for years and had carried such figures as Schley and Usher and others in the most hazardous of journeys.

New Naval Shore Service to Replace Coast Guard

Naval and Military Record, 25 June, 1924.—It is notified by the Admiralty that consequent on the transfer of the Coast Guard to the Board of Trade, it has been decided that the personnel employed in manning the naval wireless telegraphy and defense force stations at home shall be known as the Royal Naval Shore Wireless Service.

This service will be kept up to strength by the admission from time to time of volunteers from the wireless telegraphy personnel of the fleet. It will for the present contain a proportion of ranks and ratings, formerly of the Coast Guard (new force), who are serving under different conditions, but this section of the force will eventually die out.

The ratings of boatman, leading boatmen, and petty officer (wireless telegraphy) in the wireless force are replaced by telegraphist, leading telegraphist, and petty officer telegraphist respectively. The new nomenclature took effect from Friday.

Short-wave Tests in Elaborate Way

Washington *Star,* 12 July, 1924.—Thoroughly aware that short-wave or high frequency wave broadcasting will bring forth the greatest future development in radio broadcasting, the Westinghouse Electric and Manufacturing Company has completed and has been operating some months now a new specially designed radio experimental building, erected at a cost of several hundred thousand dollars.

The new building is a one-story concrete and brick structure located on the Greensburg pike, about a mile east of the Westinghouse Company's East Pittsburgh works. The site chosen is within a few feet of being the highest spot in Allegheny County, and is one of the level spots available on the hills which dot the locality.

The new site of the short-wave stations of KDKA is in direct contract to its former location, where despite some known drawbacks, transmitting with Hastings, Neb., and England was carried on nightly. When first installed the short-wave transmitter was located on the top of a nine-story building directly in the heart of the East Pittsburgh works. Steel buildings, known to have a decided absorbing effect on radio waves, completely surrounded the set and, in addition, it was located in a valley with hills on three sides. As a matter of fact, the main transmitter of KDKA is still located in the same place, and it is a matter of radio history that all of KDKA's transmitting achievements have been accomplished from this set. However, there is a probability that the 326-meter transmitter will be moved to this very desirable new location.

The new radio experimental building has been so designed that all ap-

paratus contained within it is located symmetrically with respect to all other apparatus.

The basement is divided into several rooms. The main basement chamber contains the high-power transformer plant, motor-generator sets, filter chokers and other apparatus. One of the rooms contains a transformer station of the Duquesne Light Company. The remainder of the basement is occupied by the battery room, furnace room and storage space. Power is brought into the basement through underground ducts from two separate sources, both of which are 4,000-volt, three phase, sixty cycles. This current supply may be stepped up or down as required. The available power supply is in the neighborhood of 250 kilowatts, which can be increased, however, should it be necessary.

With this basement arrangement all bulky apparatus is located out of the transmitting room and is never in sight.

The main apparatus room on the first floor of the building, in which are located the oscillator, modulator and rectifier panels, is large and spacious and having windows on all four sides is well lighted by day.

The rectifier which furnishes high voltage to the plates of the water-cooled tubes is mounted in a specially designed frame so that every part of the apparatus is accessible. Replacements and observations can be conveniently made because every part of the unit is in full view of the observer. The rectifier has a capacity which can be pushed to 150 kilowatts, if it is necessary, and is the result of the several years experimenting and pioneering of the Westinghouse Company in short-wave broadcasting. The rectifier is of the three-phase type, having a tube on each side side of the line or a total of six water cooled rectifier tubes. In front of each tube is a helix of rubber tubing to permit the use of city water to cool the tubes. On the front of the panel is a row of knife switches used to regulate the voltage of the transformers, thus governing the output of the rectifier.

The oscillator panel is of the same general construction as the rectifier panel and makes use of Westinghouse, high-power, water-cooled amberanode transmitting tubes. These are not ordinarily subjected to maximum capacity, but are usually paralleled. Thus each tube is subjected to about half its rated capacity and an unusually long life in tubes results. Another reason for paralleling tubes is that operating on the high-frequency waves causes unusual stresses and strains to develop not encountered in the ordinary radio-casting wave lengths and some safety factor is desirable. Immediately behind the tubes is the tuning inductance. In the front of the panel are located the various indicating meters. As in the case of the rectifier every part of the oscillator panel can be observed and replacements made without difficulty. The modulator panel, using the same general type of tubes, has a switching arrangement whereby the number of tubes used and the amount of power used can be regulated. Indicating meters are mounted on the front of the panel and there is also a modulation meter which shows how strongly the energy generated by the oscillator is being modulated.

Adjoining the main room and extending a few feet into it is the control room. The front and extended sides of the room have glass windows so that every part of the apparatus room can be constantly seen by the operator. This room is equipped with amplifying apparatus consisting of two units, one using five-watt tubes, the other using fifty-watt tubes. The start and stop control switches, line terminals, amplifying connections, etc., are all located in this room. Thus the engineer at his desk can control everything in the station. He also can listen in and hear the signals, thus judging them for quality.

Other rooms on the floor include the main office, sleeping room and shop.

One of the most distinctive marks of the station is the extremely unique short-wave antenna, a special type perfected by Frank Conrad, assistant chief engineer of the Westinghouse Company and the man who made most of the present records possible through short-wave development. The antenna is a copper tube erected vertically with respect to the ground and supported from a pole about fifty feet high. The antenna, which has a ball on its one end, is quite rigid to prevent its swaying. Extremely fine results have been obtained from this perpendicular type of antenna. Though only one is now installed, there will be several erected at various points about the station to take advantage of the directional effects possible through the different locations.

Wonderful results have been obtained from broadcasting from the new site of the short-wave station. As an example, it is only necessary to state that daylight transmitting was successfully carried on between this station and KFKX, at Hastings, Neb., in order to repeat from Hastings the Republican Convention proceedings at Cleveland and the Democratic convention proceedings at New York. Such a feat of daylight broadcasting would not have been believed possible on any wave length by radio experts a year ago. It is quite safe to say that there is no other station in the world now capable of doing such work.

With the new building and the new apparatus new and wonderful feats in transmitting may result this winter which will be far beyond that accomplished the past winter.

MISCELLANEOUS

Comparative Naval Data for the Treaty Powers

(Latest Data on Hand 1 July, 1924)

TABLE I—PERSONNEL (Unlimited)

	REGULAR ESTABLISHMENT		REGULAR ESTABLISHMENT ON BASIS OF 5-5-3-1.75-1.75 RATIO		INCREMENT NECESSARY TO ATTAIN THE 5-5-3-1.75-1.75 RATIO IN REGULAR ESTABLISHMENT		RESERVE PERSONNEL	
	OFFICERS	MEN	OFFICERS	MEN	OFFICERS	MEN	OFFICERS	MEN
UNITED STATES	7,873	86,000	12,585	97,125	4,712	11,175	4,256	18,179
BRITISH EMPIRE	8,571 (a)	91,397 (b)	12,585	97,125	4,014	5,728	2,179 (d)	43,858 (d)
JAPAN	7,550	58,274	7,550	58,274	None	None	1,819	29,600
FRANCE	3,914	55,741	4,404	34,994	490	(–)20,747	2,395	96,700
ITALY	2,347	42,501	4,404	34,994	2,057	(–)7,607	4,513	see (c)

(a) These figures include 319 officers and 1907 men of the British Royal Air Force that are engaged in naval aviation exclusively. The Royal Air Force is a separate department ranking with the Army and Navy and has in round numbers 3,000 officers and 26,000 men. As in the United States, Japan and France, naval aviation personnel forms an integral part of the Navy, it seems only fair that the personnel of the British Royal Air Force engaged in naval aviation should be classed in this comparison.

(b) Includes 3,790 civilians manning auxiliaries and yard craft for which regularly enlisted personnel are required in cases of other powers.

(c) There is no organized naval reserve of men in Italy, but men who have served in Navy may be called to colors by levy.

(d) Does not include 7,664 retired officers of all ages nor 18,768 pensioners under fifty-five years of age, who are additional.

TABLE II—CAPITAL SHIPS (Limited)

	Being Scrapped				Retained	
	Old Ships		New Ships			
	Number	Tons	Number	Tons	Number	Tons
United States	17	268,770	11	456,800	18	525,850
British Empire	24	500,000 (a)	None	None	20	558,950 (b)
Japan	10	163,312	2	77,158	10	301,320
France	None		None		9	194,421
Italy	None		None		8	156,300
Totals	51	932,082	13	542,955	65	1,737,941

(a) Includes the *King George V, Ajax, Centurian* and *Thunderer* to be scrapped probably during the year 1926.

(b) Includes the *Nelson* and *Rodney* now building and will probably be completed during the year 1926.

TABLE III—LIGHT CRUISERS COMPLETED SINCE 1912 (Unlimited)

	Built		Building		Totals		Tonnage on Basis of 5-5-3-1.75-1.75	Increment Necessary to Attain the 5-5-3-1.75-1.75 Ratio with Japan	
	No.	Tons	No.	Tons	No.	Tons		No.	Tons
United States	8	60,000	2	15,000	10	75,000	284,965	21	209,965(c)
British Empire	46	213,780	9	84,600(a)	55	98,380	284,965	None	
Japan	16	80,300	12	90,680	28	170,980	170,980	None	
France	5	23,440(d)	3	24,000	8	47,440	99,738	5	52,298
Italy	10	38,300(d)	None		10	38,300	99,738	6	61,438

(a) Five of 10,000 tons each contracted for within last several months.

(b) Four of 7,100 tons each and four of 10,000 tons each ordered since the Washington Conference.

(c) The Navy Department has requested Congress authorize eight 10,000 ton cruisers.

(d) Many of these are vessels taken over from the Central Powers.

Modern Submarines

TABLE IV—MODERN (Long Radius) SUBMARINES OF OVER 1,000 TONS EACH (Unlimited)

	Built		Building		Totals		Tonnage on Basis 5-5-3-1.75-1.75 Tons	Increment Necessary to Attain the 5-5-3-1.75-1.75 Ratio	
	No.	Tons	No.	Tons	No.	Tons		No.	Tons
United States	3	3,318	3	6,375	6	9,693	52,940	36	43,247
British Empire	10	19,120	1	1,480	11	20,600	52,940	32	32,340
Japan	2	2,400	23(a)	29,365	25	31,765	31,756	None	
France	0	....	9	9,792	9	9,792	18,529	6	8,737
Italy	0	....	0	....	0	....	18,529	15	18,529

(a) This is an estimate based on Admiral Kato's statement in announcing post-treaty building program to the effect that Japan would build twenty-two submarines of a total tonnage of 28,165 tons The other one included is the No. 52 reported to be of 1,200 tons displacement. The average displacement of the 22 submarines in the post-treaty program is 1,280 tons.

TABLE V—MODERN COAST DEFENSE SUBMARINES OF LESS THAN 1,000 TONS EACH (Unlimited)

	Built		Building		Totals		Tonnage on Basis 5-5-3-1.75-1.75 Tons	Increment Necessary to Attain to 5-5-3-1.75-1.75 Ratio	
	No.	Tons	No.	Tons	No.	Tons		No.	Tons
United States	86	60,826	6	5,436	92	66,262	69,915	4	3,653
British Empire	25	22,350	5	4,590	29	26,940	69,915	43	43,975
Japan	34	30,148	14	11,800	48	41,948	41,948	None	
France	24	18,403	12	7,020	36	25,423	24,470	None	
Italy	10	8,040	4	None(a)	10	8,040	24,470	17	16,430

(a) Four authorized but not laid down; 1923 program.

TABLE VI—FIRST LINE DESTROYERS AND FLOTILLA LEADERS (Unlimited)

	Built		Building		Totals	
	No.	Tons	No.	Tons	No.	Tons
United States	288	342,086	None	.....	288	342,086(a)
British Empire	199	237,175	4	6,200	203	243,325
Japan	65	68,228	27	36,800	92	105,028
France	21	21,607	18	30,936	39	52,543
Italy	32	39,613	7	11,200	39	50,813

(a) Very nearly all of this great destroyer tonnage was laid down during the World War in an emergency program designed to combat the German submarine. Many of the ships are of hasty construction.

Proposed Programs

The proposed building programs are as follows:

France—In addition to the units shown above, the second half of the French building program now before Parliament proposes the laying down from July, 1924, to July, 1928, of the following—six 10,000 ton light cruisers, fifteen 2,400 ton destroyer leaders, two 3,000 ton cruising submarines, thirty 1,300 ton fleet submarines, and seven coastal submarines of 600-1,300 tons each. According to newspaper reports the seven coastal submarines will be mine layers.

Italy—The Italian building program is reported to be five light cruisers, twenty destroyers and twenty submarines to be laid down between 1923-1924.

The program for this year is two light cruisers, the *Trento* and *Trieste*, four fleet submarines and eight destroyers. These ships have not yet been appropriated for, although the contracts for four of the destroyers have been let.

All of these units are in addition to those shown under present program.

United States—A bill (H. R. 8687) authorizing the modernization of the six oldest capital ships, and also the construction of eight 10,000-ton cruisers and six river gunboats, passed the House on May 28, 1924. It later passed the Senate (5 June, 1924), but, on a motion "to reconsider the vote" made by Senator King (Utah), which consideration was given during the few remaining days before the adjournment of Congress, the

bill is still in the hands of the Senate whose action is expected to be favorable in the fall. This bill gives the authorization and not the necessary funds required, which must be taken care of by Congress in the regular annual appropriation bills for the next several years. The Appropriation Bill 1925 provided funds for one minelaying submarine.

Naval Vessels in Commission

		United States Active	United States In Reserve	British Empire Active	British Empire In Reserve	Japan Active	Japan In Reserve
Caiptal Ships		18	None	16	3	8	1
Aircraft Carriers		1	None	1	None	1	None
Cruisers (8000 tons plus)	Modern, 1st line	None	None	1	2	None	None
	Old, 2d line	5	None	None	None	4	
Light Cruisers	Modern, 1st line	8	None	28	3	13	None
	Old, 2d line	3	None	4	7	4	1
Destroyers	Flotilla leaders	None	None	8	8	None	None
	Destroyers, 1st line	103	None	60	120	51	12
	Destroyers, 2d line	None	None	None	6	8	4
Submarines	Large (over 1000 tons)	None	None	9	1	2	None
	1st line (500-1000 tons)	78	None	13	9	31	None
	2d line (500-1000 tons)	3	None	19	4	10	None
Miscellaneous types		196	None	211	39	32	45
		415	None	370	202	164	67
				202		67	
Totals		415		572		231	

Disregarding the Experts

Naval and Military Record, 25 June, 1924.—The Council of the League of Nations has made up its mind to have nothing more to do with naval experts. This decision announced at last week's meeting, is the result of the conference held in Rome in February to discuss further limitations of sea armaments. It will be remembered that this meeting ended in a fiasco. The delegates were all technical experts, and after several days of valuable discussion it became clear that they could not agree on even the most basic principles. So the disappointed council is resolved to refer the whole question to the fifth assembly of the league, which meets next September, in order that the problem may be reconsidered afresh.

This ideal of peace at any price is all very well in its way, but any purely academic discussion, eliminating the practical aspects, which are entirely a matter for technical experts, cannot possibly lead to any unity of international agreement. The Washington compact was only framed after the most exhaustive investigations and representations by naval advisers from the various countries which took part in the conference. With all due respect for the beneficent objects of the League of Nations, the present is not an opportune juncture for a renewal of talk about the further restriction of naval armaments. It is true that the United States

is coquetting with the subject, at the same time that her Navy Department, and a great national party at the back of it, is pressing for a collossal appropriation for naval expansion. Japan is in no mood to modify her program of warship construction (the biggest in the world) at American dictation. The French yards are very busy, and even the Italians are more active than usual. We are entering upon a new cycle of cruiser building, but to call this "competition" is absurd. None of the countries is building against the rest, but simply up to the standard of what she deems to be her own particular naval needs.

New Problems Arise in Mediterranean

By W. P. Crozier, Baltimore *Sun*, 6 July, 1924.—Manchester, England, June 3.—After 1904, when France and England became friends, England called in her fleet and concentrated it against Germany in the North Sea. France left the defense of her northern coasts to England; England, although she kept a small squadron at Malta, left France in control of the Mediterranean.

The result of the Great War is that there is no need for the British Fleet in the North Sea and that therefore it is concentrated in great force in the Mediterranean. This is in itself an important political event. A fleet is placed where it is likely to be wanted and because it is likely to be wanted there and not somewhere else. If the whole or the greater part of the United States Fleet were to be stationed more or less permanently, not in the Atlantic but in the Pacific, everyone would know what to think, so in the Mediterranean.

The other day there was a great British naval concentration in the Mediterranean. Of course, no particular power or powers are threatened, or even hinted at, in such a measure. But, obviously, the fleet is there because this is the area in which it is thought that vital British interests might conceivably be threatened by someone, and this fact in itself tends to accentuate the political situation from which it springs. The two sides of the question aggravate each other. Political instability leads to a British naval concentration. The naval concentration calls attention to the political instability and emphasizes it. The other powers "take note." The problem begins to harden.

There are two new elements in the Mediterranean question as it is now developing. There might have been a third in the expansion of Greece. Had Greece held Smyrna, the coastal region of Asia Minor and the Ægean shores right up to Constantinople, she would soon have emerged as a formidable naval power, but she has lost Asia Minor and Western Thrace and, though Italy suspects and dislikes her, she is negligible for the present.

Italy herself is the first of the new weights in the balance—Italy under Mussolini, proud, ambitious and aggressive, dreaming of reviving the glories of ancient Rome and full of the idea of "the Mediterranean of the Mediterranean nations" (of whom England is not one).

Italy considers that she was shouldered out of her due share of the "profits" of the war by the United States and England. She remembers that the African and Asiatic shores of the Mediterranean have been largely appropriated by France and England (France has Morocco, Tunis, Algiers and the mandate for Syria; England has the mandate for Palestine and is still predominant in Egypt and the Sudan); whereas Italy has only a narrow strip of coast in Tripoli, with a barren *hinterland*, and has not even obtained the "sphere" in the Asia Minor for which she hoped.

When the recent conference about Tangier was held in France, England and Spain, Italy made application to be admitted and was refused by France. In her annoyance she has made an "understanding" with Spain. In a military sense, Spain counts for little; nevertheless, she has a com-

mon frontier with France, which France in an emergency could not neglect.

Italy, in a word, is dissatisfied and determined to assert her "place in the sun." She holds the islands of the Dodecanese ("Twelve Islands"), which are Greek in character, but she will not return them to Greece because she fears the growth of an island power in the eastern Mediterranean, just as she fears the emergence of Jugo-Slavia on the Adriatic coast.

Like France, she has since 1918 recognized the power of the airplane and is rapidly developing her air force. Her press, which is less discreet than her government, has talked very frankly about the ease with which squadrons of Italian planes, based on the heel of Italy, on Sicily and on the Tripolitan ports, could dominate the line of communications through the Mediterranean to the East. That line of communications matters a little to France, but most of all to England.

There is, however, another sea passage in the Mediterranean which is of immense, possibly vital, significance to France, and this is the second new element in this modern problem of the Middle Sea.

The kernel of French military policy is now the utilization of the "black army" from Africa in the next European war. This black army will have to be transported across the Mediterranean from the Algerian coast to Marseilles—a steam passage of thirty hours. That, in a nutshell, is the Mediterranean problem for France—how to provide a secure and continuous passage for a constant stream of black troops amounting, it may be, to three-quarters of a million, or a million, or as many more as may be needed according to the length of the war.

We must distinguish carefully what the "black army" really is. It is not the force raised in Algeria and Tunis, for this is composed of Arab and Franco-Arab stock which in color and civilization is not easily to be distinguished from the Southern French. *"La France noire"* (Black France) means the tribes of equatorial Africa—Senegal, Dahomey, French Gold Coast and Nigeria. These men are admittedly, in all essentials, savages. The present French program provides for a standing force of about 200,000 colored troops and it is estimated that in the normal course, if a great war breaks out, there will be three-quarters of a million or more ready trained, with an enormous reservoir of untrained men that can at once be drawn on.

To transport this black army all the way by sea from West Africa to Marseilles would be extremely difficult. There would be the long journey off the coast and around the great northwestern bend of Africa, followed by the passage through the Straits of Gibraltar. Submarines and airplanes borne in fast carriers would have endless opportunities. Therefore the French are elaborating a twofold scheme.

First, they intent to build a railway 2,000 miles long which will run from the Algerian railway system southward through the desert and drain the man-power reservoir of equatorial Africa. This trunk line will run to the border of Togoland, which formerly belonged to the Germans and is now held under mandate by France. Be it noted that France actually has the right in the event of a great emergency, like another European war, to recruit native soldiers in this mandated territory. That is why the projected trunk line is to be carried close to the Togo frontier. Subsidiary lines, running east and west, will act as feeders to the main railway. By this route the "black army" will be carried to the Algerian coast.

As the black army streams toward the Algerian ports the question arises how it is to be ferried safely over to Marseilles. This is the consideration which, more than anything else, will decide French policy in the Mediterranean.

During the World War France had England on her side and had never any difficulty in transporting troops from Algeria. The German submarines, so far as they entered this sea, devoted themselves almost almost entirely to attacking merchant shipping, but the future is entirely dark and uncertain and France has to devise a means, if possible, of safeguarding the sea passage by her own resources.

There are only two ways: She may form about herself such a coalition of powers as will secure control of the sea against any possible opponents, or she may develop her own naval weapons of offense and defense in such a way as to secure safe passage by her own strength.

France is already taking the second course. She has much the strongest air force in Europe, and she has always been opposed to any restriction of strength in submarines. The airplane, the submarine and the small fast "chaser" are to be the weapons by which she hopes to hold off any attack upon the sea passage from Oran in Algiers to Marseilles.

She has not yet reached that happy position, but it is not necessary. At the moment the surface warships of England would give her no chance, and even Italy would be a match for her. But in ten years' time, or twenty or thirty, when the desert railway is working and the "black army" waits—then who can say whether surface vessels will be able at all to keep the seas against the seaplanes which will spring out in flocks from the African and French coasts, from the islands and from the decks of the fastest ships afloat, and all will alight and squat on the water till the enemy appears and then take flight to meet him.

On the other hand, France cannot easily at the moment improve her political position in the Mediterranean. She has antagonized England by her European policy in general, and she has offended Italy by refusing her admission to the Tangier conference. At this conference France secured a highly advantageous position at Tangier, and Italy, who considers herself as historically the greatest of the Mediterranean powers, regards herself as locked in her own sea by France at Tangier and England at Gibraltar.

The grouping of the powers in the Mediterranean is therefore, and is likely to remain for some time, uncertain and confused, and that, no doubt, is the ultimate reason why much is heard in the press of the different countries about naval and air armaments. The movement for a reduction of forces in airplanes, submarines and small craft will have to be preceded by a great improvement in the political relations of the European powers.

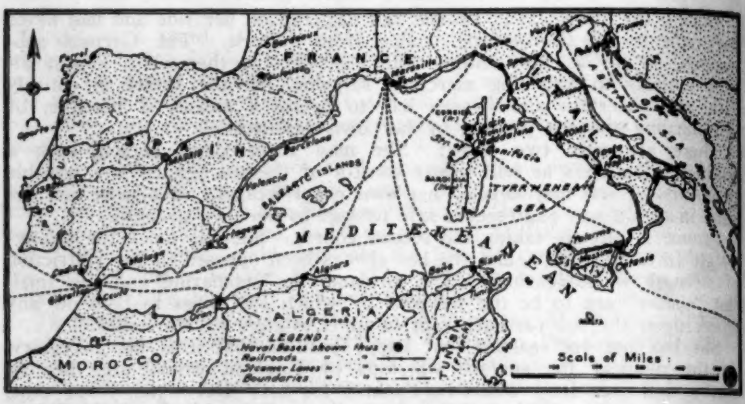
It was easy for some of the European countries to assent at Washington to a reduction in capital ships because they were in that respect hopelessly inferior to the leading powers, but in respect of the weapons by which the weaker powers hope to be able to nullify the advantages of the stronger, there—and this applies to the Mediterranean—they will come to the conference table (if they come at all) with a stiff lip.

It is not for nothing that an Italian paper already represents England as proposing a disarmament conference because she has just found that the naval forces of the Mediterranean powers are beginning no longer to be negligible.

Present Situation in the Mediterranean

Army and Navy Journal, 28 June, 1924.—Recent demands for a new naval conference have again focused the attention of naval authorities of the world on the European situation.

In a recent article, Captain Dudley W. Knox, U. S. N., naval correspondent, pointed out the rivalry of France, England, Spain and Italy in the Mediterranean.



The possible alliance of Spain and Italy against France, which would be most favorable to British policies is, in the same measure, alarming to French interests.

Under such conditions, which practically have continued to exist to date, there is considerable doubt, experts declare, of the advisibility of calling a conference.

U. S. Control Ends in Santo Domingo

Washington *Star*, 13 July, 1924.—Santo Domingo, July 12.—General Horacio Vasquez and Federico Velasquez, whose election as president and vice president, respectively, was proclaimed by the national assembly on July 7, four months after the general election, took the oath of office today. The ceremony was held in the national assembly in the presence of numerous diplomatic and consular officials.

This afternoon the American flag was lowered from the fort and the Dominican emblem hoisted. The great crowds which assembled in the capital from all parts of the republic then engaged in an enthusiastic demonstration in honor of the new president.

The inauguration of General Vasquez as president of the Dominican Republic brings to a successful end the long struggle of more than eight years by the people of Santo Domingo to regain their sovereignty and independence, which they have contended was taken from them by the United States when their country, under orders from Washington, was placed under the control of a large military force.

After the setting up by the United States of a military government, the Dominicans made repeated efforts to bring about a withdrawal of the forces. In 1920 Horace G. Knowles, former American minister, started a campaign to secure sovereignty for the Dominicans. Subsequently, the United States Senate authorized a special committee to inquire into the occupation and administration of the country, and such a committee proceeded to Santo Domingo, setting up a court of investigation.

The committee's return to Washington was followed by an agreement for the withdrawal of the American forces from the country. The full and complete sovereignty of Santo Domingo was restored and, for the first time in about ten years, an election was held March 15, last, General Vasquez being elected president.

There remain in Santo Domingo about 1,800 marines and officers. The evacuation has begun and transports are taking the troops to the United States as speedily as possible.

Wilbur Favors Sending Solar Eclipse Party

Washington *Post,* 20 July, 1924.—Secretary of the Navy Wilbur yesterday approved the naval observatory project for sending an expedition to Sumatra to observe the total solar eclipse in January, 1926. From the results of the observations which it is expected to make, it is believed valuable data will be obtained in regard to magnetic disturbances on the sun, and which at times seriously effect cable, telegraph and possibly radio communications.

Photographs of the sun are taken by the naval observatory on every clear day and reports are made to telegraph companies as they desire them. The appearance of sun spots indicates magnetic storms that might affect cable communication.

Frozen Light

Washington *Post,* 13 July, 1924.—"Frozen Light" has been officially adjudged a genuine discovery of the highest importance by the French Academy of Science following the report of a jury of scientists on the demonstration given by Camille Dussard, inventor of the process. Dussard approached a 2,000-candlepower lamp and touched the wires with his fingers, receiving neither shock nor burn. The inventor asserts it is possible to build lamps as high as 10,000-candlepower which will not give off the slightest heat, while it will be only a short time before all danger of fire will be removed from electricity.

The importance of the invention is shown by the single fact that in a 100-watt lamp only one watt actually illuminates, the others, according to Dussard, being merely heat. Dussard lamps of one or two watts replace the big lamps, effecting a huge saving of current.

The Dussard process can be so applied, according to him, in the X-ray process, but the jury reserved decision on this point pending renewed demonstrations. Scientists say that if the heat can be removed from the Roentgen ray all the present danger attached to the manipulation of the ray will be removed. In a similar manner, Dussard showed how cold light could be used for the projection of movies, thus absolutely preventing danger of fire even with inflammable films.

U. S. Placed at Disadvantage by Avoiding Metric System

Washington *Star,* 13 July, 1924.—Pleading that the United States in time of war will be put at a great disadvantage by failure to use the metric system of measurement, the World Metric Standardization Council has inaugurated a strong movement to enlist the support of administration leaders in support of a plan for adoption of the metric system by this nation. Secretary of Commerce Hoover, who recently declared himself in favor of the introduction of standards to be agreed upon by all commercial nations, has been asked to assume the leading rôle in the effort to put the United States on a metric measurement basis.

Delegates from all the countries of the western hemisphere will meet in Lima, Peru, in November in a great pan-American commercial conference, to which the United States will be a party, officially represented. At this meeting it is understood an effort will be made to induce the United States to follow the lead of European nations in adoption of the metric system. Such an attempt was made several years ago, and so strong was the backing of a measure designed to place the United States on a metric basis that it failed of passage by Congress by a single vote.

Recently officials of the Pan-American Union have placed themselves behind the movement to bring the United States into line. The Inter-American High Commission, the Pan-American Federation of Labor, the

Customs Congress of American Republics, the International Conference of American States and other organizations to which the United States sends delegates, have all declared themselves in favor of placing this nation on a metric basis. The overwhelming sentiment of pan-America, according to the metric standardization council, is for International American standards of quality on a world metric basis.

These standards, say officials of the council, can readily be reconciled with existing American standards so as to accord with the world metric units of weights and measures, now adopted for commercial use by a great part of the population of the earth. They require only that the United States shall advance the present yard ten per cent to the meter, or world yard of approximately thirty-nine inches; advance the present United States liquid quart five per cent to the liter or world quart; and advance the present pound avoirdupois to the 500-gram weight, or world pound. Such changes, while complicated with respect to changes in present standards of American units of weights and measurement, would mean more in the long run even by destruction of the present scales, according to proponents of the plan than would perpetuation of the present scales.

More than 200 member organizations of the Chamber of Commerce of the United States are on record in favor of the metric measurements. More than 100,000 metric petitions are pending before Congress, demanding metric legislation. Many of these are from organizations having thousands of members, representing in the sum total millions of voters. The states of Illinois, California, North Dakota, Tennessee and Utah, with a combined population of fifteen million persons, have gone on record and officially memorialized Congress through their state legislatures to adopt the metric system.

Practically the only opposition to the adoption of the metric system, according to the standardization council, comes from a group who fear to establish the meter as the unit of extension. To the world quart (the liter) and the world pound (500 grams) there have been practically no objections. These objectors, the council contends, overlook the fact that the meter is urged for commerce, for business only. Although it is well known that the meter and its decimal divisions are well adapted to industry and are used to advantage therein throughout the world, the specific proposal is that the meter be used in merchandising, with manufacturers continuing to use whatever units they desire in production. The use of the meter in merchandising, the council declares, is an advance to uniform terms of description and does not alter the size of anything.

"In the face of the keenest trade competition the world has ever known," says Aubrey Drury, executive secretary of the council, "we are bound to utilize all the efficient time-saving, labor-saving methods developed by moderns. We cannot afford to try to muddle along with stone-age tools of trade, which most progressive peoples were wise enough to scrap long ago. How pitiful it is to hear obstructionists prate about the cost of making the gradual transition to metric units, when blind retention of the present clutter of weights and measures entails an immense monetary loss in impaired national efficiency and the loss of millions of dollars in profitable wage-paying trade."

British to Raise Scapa Flow Fleet

Washington *Star*, 19 July, 1924.—London, July 19.—During the war, the British salvage successes were notable for the recovery of German codebooks, which are still a secret. The new chapter opened with the "Laurentic Operations," and now another mighty task is beginning—the raising of the German Fleet at Scapa Flow. It will mean seven years of hard toil. Many have said, "Why do they need to salvage the German Fleet?" Well, the

old saying is, "practice makes perfect" and successful experiments in these operations may mean more than does the Laurentic gold. Never have the British had and perhaps never shall again have, such an opportunity of testing their salvaging capabilities.

The equipment of the vessels devoted to the salvage work on the German Fleet comprises a bewildering assortment of engineering appliances all immensely powerful, all of the simplest possible construction, and all made of such material and treated in such a way that being in or under water for a few days or even weeks does them no real harm. There are pumps capable of drawing up over a ton of water a second, and not given to shirking if the water be muddy or sandy; hammers, drills and riveters, worked by pneumatic pressure, and striking about 1,500 blows per minute, either under water or above. Electric lamps illuminate the gloomy recesses of a sunken vessel's hold or blaze above the dark water when the lost ship has risen again to light the workers as they secure their prize for towing into port.

But more wonderful than all is the use made of the most powerful explosives. Dynamite charges, carefully graduated, are used either for clearing away an obtruding pinnacle of rock or attached to the ragged edges of a rent in the side of a sunken vessel for blowing those edges smoothly off in order to allow a patch to be built over it.

For certain cases there will be pontoons, hollow iron tanks of varying sizes, their lifting power carefully noted, and their shapes so arranged that they fit closely to the sides of the wrecked ship. These are secured to the ship, and can be sunk and fastened to the sides of the vessel under water by the divers, then pumped out and made airtight. They then immediately exert all their enormous lifting power. There is the salving ship herself, a vessel not too large, but of immense strength of hull, of great engine power for towing purposes and equipped with mighty cranes and derricks for hoisting weights up to fifty tons each. An all important item is her electrical installation for the working of searchlights and arc lights of great power. An air-compressing plant is necessary for the working of the pneumatic tools which form so important a part of the diver's equipment.

The salvaging of a battleship is a totally different proposition from that of a merchant vessel. Few people ever think of the enormous masses of metal, some over a couple of hundred tons in weight, that are to be found in a modern battleship, the lifting of which taxes all the resources of even a dockyard. If every ship in Scapa Flow were in the same position the task would be easy, but that is not so. Some idea of the task may be gathered from the fact that all ships lie in a different position. For instance, the *Hindenburg* is standing upright, the *Derfflinger* nearly on her side, the *Seydlitz* bottom up, cruisers with their bows in the air, and the others in various positions. This shows that every ship will need its different methods. Let us take the *Hindenburg* on an even keel. With the depth of water and the plan of the ship, a cofferdam can be built right round her upper works—an immense superstructure, watertight and reaching the surface of the water. After the divers have closed all holes, the great pumps can be set to work and the ship brought to the surface. Many ships have been salvaged in this way.

With the *Seydlitz* it is a different matter altogether, for had she also gone down on an even keel, pumps and plenty of them, would soon have brought her up again, but the 24,000-ton ship has been overturned, and the righting of a capsized vessel is always a ticklish job. The main advantage in this case is the space in which to move the salvage craft and mighty lifting derricks, for it is essential that the lifting craft should be able to move freely all around the capsized vessel if she is to be brought to the surface again. Much blasting may have to be done with explosives, getting rid of the masts and other obstructions, for that is the first step towards

salvage. Then the divers will be sent into the interior of the ship with orders "Close all port holes and every other opening you can find."

By this time, however, the ship will have sunk some distance into the ooze, and many tons of mud will have shifted to the port holes and other openings to make things unpleasant and difficult for the divers, as well as adding considerably to the weight to be lifted. The port holes, owing to the ship's position, will be no easy task to get at, but by using compressed air and turning powerful jets of water on the mud one by one can be screwed up. It is a nerve-trying, risky work and the divers have to study hard to get the "hang" of the ship before they venture down. The floors of the cabins of many of the ships, of course, will now be the walls, and the walls have become floors, the doorways making pits for the unwary to fall through.

When a diver falls, tragedy may easily occur, so all the time the men have to be on the alert. Coupled with these drawbacks is the fact that in the interior of the ship the water is thick with mud, making it impossible to see, and the divers have to trust to their fingers—like blind men they will grope about, relying upon their sense of touch to tell them that things are all right.

It will be a mighty task to roll over this 24,000-ton carcass of a ship, and it seems at a glance impossible that such a thing can be done; but a success will be achieved. For a ship lying on her side, and which has now dug herself into the yielding ooze, it will be essential to remove all the mud between her keel and the bottom in order to give her free movement.

The oxy-acetylene blow-pipe may prove a great advantage in making holes through metal bulkheads, or the oxy-torch, by which metal can be actually burnt under water. It seems incredible to think of heating iron to melting point when surrounded by a mass of water, but the flame is encircled by a cylindrical jet of air that blows away the water. The heat is very intense and highly localized, and as a result the temperature is raised enough to heat through the iron and steel. Plunge a match into water and it goes out. Even the blaze of a ship alight from stem to stern is put out as soon as she sinks.

The end of the electrical torch used is shaped something like a cup, in the center of which is the electric arc, which generates a heat of 6,700 degrees F. Around the arc is a series of apertures, arranged in a ring, through which the highly compressed gas is delivered. The intense heat of the gas—about 3,000 degress—drives back the water from within the cup and reduces it to stream, thus leaving the waterless space for the electrical arc.

CURRENT NAVAL AND PROFESSIONAL PAPERS

"Results of Some Rolling Experiments on Ship Models."—By M. P. Payne, R. C. N. C., *Engineering*, 13 June, 1924.

"Advanced Naval Bases."—By S. F. Staplis, and Captain D. L. Munro, C. M. G., R. N. (Retired), *Engineering*, 27 June, 1924.

"Economy versus Efficiency."—Editorial, *The Engineer*, 20 June, 1924.

"The Stability of Ships as Concerning the Naval Architect and the Shipmaster."—By Dr. Ing. Carl Commentz, *The Shipbuilder*, July, 1924.

"Foreign Ideas on the Subject of Artillery."—By Commandant Laurent in *Revue d'Artillerie* translated in *Journal of Royal Artillery* by Brig.-Gen. W. Evans, C. M. G., D. S. O.

NOTES ON INTERNATIONAL AFFAIRS

FROM JUNE 23 TO JULY 23

PREPARED BY

PROFESSOR ALLAN WESTCOTT, U. S. NAVAL ACADEMY

LONDON CONFERENCE ON DAWES PLAN

INTERALLIED CONFERENCE IN LONDON.—An interallied conference met in London on July 16 to consider the plan of dealing with German reparations submitted by the committee of experts headed by General Dawes. Included in the conference were representatives of Great Britain, France, Belgium, Italy, Japan, Portugal, Greece, Jugoslavia, and Roumania. Ambassador Kellogg, assisted by Colonel James A. Logan, the American observer on the Reparation Commission, was instructed to attend the conference for the purpose of dealing with such matters as affected the United States, and otherwise for purposes of information. In appointing Mr. Kellogg as official representative, the United States Government expressed its earnest desire that the Dawes Plan be adopted.

In preliminary conferences the British and French premiers had reached substantial agreement upon the adoption of the Dawes Plan, but serious differences of opinion remained as to details of its enforcement. The chief difficulty was as to the final authority which should decide whether or not Germany was in default, France preferring that this authority be left with the Reparation Commission with American representation, and Great Britain preferring some final authority less under French control. At the opening session three committees were appointed. The first was to deal with the problem of German defaults; to decide what body was to adjudicate upon whether Germany shall have defaulted under the Dawes scheme and in that case what measures were to be taken.

The second committee was to consider the best way of restoring German economic and fiscal unity as postulated by the Dawes Committee.

The third was to deal with the methods of transferring German payments from the receiving body in Berlin to the creditor countries.

PRELIMINARY CONFERENCES OF FRENCH AND BRITISH PREMIERS.—Prior to the July conference, a meeting of Premier Herriot of France and Premier MacDonald of Great Britain was held in London, on June 22. The two premiers then agreed upon the July meeting, and also agreed to visit Geneva for the opening of the League of Nations Assembly in September. To clear up serious misunderstandings which subsequently developed, the two

premiers met again in Paris on July 9, and drew up a memorandum embodying the agreements reached, in substance as follows:

The first four pages of the Premiers' statement gives the genesis of the experts' plan, citing the Treaty of Versallies on several points and reviewing how the Reparation Commission had called General Dawes and his colleagues together. The purpose of this part of the statement is of course to reassure French opinion that the Dawes plan came under the treaty and therefore left the treaty intact.

Then comes the statement that the allied governments are about to take the action asked by the Reparation Commission. The formal decisions of the two Premiers are next enumerated. It is first set forth that the conference is to be held in London on July 16 and pleasure is expressed at American participation. Then comes a pledge of the two governments to accept the Dawes plan in its entirety. The third paragraph begins: "The arrangements to be arrived at should not affect the authority of the Reparation Commission. It is added that because of special protection to which the lenders of funds are entitled "the two governments will work together to obtain the presence of an American on the Reparation Commission in case the commission is called on to decide whether Germany has defaulted." If this solution is not possible, it goes on, and in case the members of the Reparation Commission cannot reach an agreement the two governments will recommend that the commission call in the general supervisor of payments, who should be of American nationality."

To the British mind this represents a compromise between the French and English views, although the French never opposed America having full representation on the Reparation Commission. It was impossible to obtain information whether the two Premiers had any assurances from Washington as to full membership in the Reparation Commission, but it is believed they had not.

The joint declaration says that in case of a declaration of German default the interested governments shall confer upon putting into operation penalties to be agreed on. Instead of a statement that the economic penalties should be withdrawn in the Ruhr and Rheinland two weeks after the beginning of operation of the Dawes plan the issue is left to the London conference. Provision is made for the studying of any alterations in the Dawes report which may be judged wise. It is also provided that a special committee of experts shall be set up to give the allied governments advice on the Dawes plan.

Instead of the suggestion in the British Foreign Office statement that the World Court should decide questions of interpretation of the plan, the new agreement says the Governments shall consult their jurists, which means that this issue is left open.

GERMANY CONSENTS TO MILITARY INVESTIGATION.—On June 30 Germany sent to the French Government a note consenting to an allied investigation of the military status of the reich, as demanded by the Allied Powers. The note, however, requested that the investigation be completed by September 30.

In reply on July 9 the Allied Powers stated that the inspection would begin on July 20, but that it was not for Germany to make conditions as to its duration, and that transfer of supervision to the League of Nations would depend upon the situation revealed by the investigation.

EASTERN EUROPE

CONFERENCE OF LITTLE ENTENTE.—A conference of the Little Entente powers began at Prague on July 11. It was stated that one of the purposes of the conference was the establishment of a United Council for Foreign Affairs which should represent the Entente in all international questions. Rumania's difficulty with Russia over Bessarabia was not discussed, nor was the question of recognition of Soviet Russia.

UNITED STATES AND LATIN AMERICA

HAWAIIAN JAPANESE BARRED FROM UNITED STATES.—According to a ruling of the U. S. Department of Labor, the Japanese in Hawaii, although not affected by the exclusion provisions of the new immigration act of 1924, may still be excluded from the main land of the United States under the General Immigration Act of 1917. According to the 1920 census the Japanese in Hawaii formed 42.7 per cent of the total population and numbered 109,000, having increased since 1910 by 30,000. The present number of Japanese in Hawaii is probably about 125,000. Further immigration of Japanese to Hawaii is prohibited by the new law.

BRAZILIAN REBELLION.—Early in July a serious rebellion broke out in the state of Sao Paulo in Southern Brazil. Rebel forces estimated at over 30,000 occupied the city of Sao Paulo, established a provisional government, and began operations against the port of Santos, the base of communications for Federal troops.

The city of Sao Paulo is a center of the coffee trade, and has had a phenomenal growth in recent years to a population of 700,000. According to a statement from the Brazilian consulate in New York, the unrest in Sao Paulo has arisen partly from political hostility to President Bernardes, and objection to training of the police force by French officers. Federal troops in the state were largely sympathetic with the revolt.

MEXICAN DEBT AGREEMENT SUSPENDED.—On July 1 President Obregon issued a bulletin announcing the inability of the Mexican Government to pay the interest of $15,000,000 due on Mexico's foreign debt, according to the agreement entered into last year with an international committee of bankers headed by Thomas W. Lamont. President Obregon blamed the failure to misrepresentation on the part of his former finance minister, Huerta, and obstruction of a relief loan by American oil interests. Negotiations for a relief loan were under way, but collapsed at about the same time as the expulsion of the British diplomatic representative in June.

The debt agreement, now suspended, provided for an interest payment of $15,000,000 in 1923, to be increased annually by $2,500,000 from 1924 to 1928.

BOOK REVIEWS

SEA POWER IN ANCIENT HISTORY—The Story of the Navies of Classic Greece and Rome. By Arthur MacCartney Shepard, with a Foreword by Rear Admiral William A. Moffett, U. S. N. Boston; Little, Brown, and Company; 1924. Octavo, pp. i-xxx, 1-286. $5.00.

A Review by Captain Roy C. Smith, U. S. N. (Ret.)

This is an interesting and readable summary of the sea power of the Mediterranean peoples from the earliest time to 476 A. D. The author traces the growth and necessity of sea power in relation to commerce and warfare from the early Phoenicians to the end of the Western Roman Empire. He finds that the underlying reasons have not changed materially, though methods were and are continually changing. Through it all is the great influence exerted by sea power in all times, the thesis first strikingly analysed and illustrated by the late Admiral Mahan.

There are descriptions of warship and personnel, of training, administration, maintenance, weapons, and of tactics and strategy, the last two rather general. (The author in his preface states that his work is not planned primarily for naval officers but for the large class of readers interested in historical literature). Sea warfare was at first like land warfare, combats of armed men at close quarters, their ships in contact and grappled. Later there was maneuvering, and injury to vessels by ramming, or breaking off of oars, or by missile-throwing engines. The tactical combinations, breaking the line, outflanking (capping), were for the purpose of bringing a superior force against a portion of the enemy force (the basis of all tactics), and resulted in formations and maneuvers that have been employed throughout the history of naval warfare.

While tactics have varied greatly with the means employed, strategy remains much the same, owing to the natural configuration of the theater of war, and the effort to move an adequate force to the strategic center and maintain it, both during transit and on arrival. The galleys were not very seaworthy, and had limited storage capacity. Fresh water and the weather were their main concern. They usually, on both accounts, cruised near the shore and hauled up for the night.

The author's account is more concerned with a narrative of the main events of the period he is describing; but from this narrative the naval student may discern certain unvarying principles of tactics and strategy applicable to all times. For instance, all warfare is the application of force. It depends on factors peculiar to the means employed, as well as on exterior

factors dependent on the climate and the characteristics of the theater of war. For convenience the factors may be called the elements of warfare. They are the weapons, the masses in action, the motion or movement of the masses, the resistance to deformation or destruction of the masses, the means of communication, the self-sustaining capacity of the masses, the climate and weather, and the natural and artificial features of the terrain and the theater of war. Some of the elements are seen to be internal, or peculiar to the forces themselves; others are external, or dependent on weather, climate and the theater of war. Some of the elements govern tactics, as weapons, masses, motion, resistance, communications, terrain and weather; others govern strategy, as self-sustaining capacity of the unit masses, motion or movement, communications, climate, weather, and the features of the whole theater of war. The reader, by considering the above various elements successively in the events narrated, will find that the tactics and strategy of the period are the natural result, and become at once apparent. The average tactics and strategy only of the period are here considered. The personal element will always rule, but cannot be considered as an element of the average tactics and strategy; for the personal element itself is of the same average in all times and will not change the average result.

As an instance of an analysis of this character, what would be the tactics of the trireme? First, *weapons:* Main weapon the ram (beak); others, war engines, bows and arrows, javelins, hand-to-hand weapons. Next, *masses:* The mass of the unit considerable relatively; the number of units variable. Next, *motion:* Internal, oars; in calms and light winds can move at will; speed considerable for short periods. Next, *resistance:* Light construction, flanks weak, but bows strengthened for ramming; can be easily sunk by ram attack in flank; motive power may be destroyed by breaking off oars. Next, *communications:* By word of mouth and visual signals; adequate for ordinary purposes. Next, *terrain:* Sometimes in the open, sometimes constricted by land. Next, *weather:* Variable, but the average conditions suitable for the handling of the units. *Resulting tactics:* To attempt by speed and suitable formations to bring a superior force in contact with a portion of the enemy; breaking the line or capping. To attack by surprise in flank and ram. To use war engines and missile weapons when in range; to sweep off the enemy oars; to board and defeat in hand-to-hand combat. The best results in case of a superior force to be obtained in the open, unrestricted by proximity of land. Such were the actual tactics of the period, and such is the deduction from a consideration of the elements.

It is interesting to note that when the interrelation of the elements is similiar, similiar tactics will result, though the elements themselves are quite different. For instance, modern cavalry: The horse himself is the principal weapon, head-on attack (charge) strong. Cavalry weak in the flank. Speed and mass considerable. Tactics: Attack by surprise in the flank, if possible, in any case by charging. In other words, the elements

bearing a similar relation to each other, the tactics are similar to galley tactics.

The author's narrative embraces the early Phoenician and Greek navies, the growth of commerce, sea power and colonization; the Graeco-Persian war, the rise of Athens as a sea power, and the battle of Salamis; the necessity of sea power for supremacy and empire; the Peloponnesian and Sicilian wars; the decline of Athens; later Greek naval history, sea power in the campaigns of Philip and Alexander; early Roman history, Sicily and Carthage strongest at sea; decline of Greek power in Sicily; the Romans a land people, but forced to take account of Carthage; the Punic wars, Romans use *corvi* (crows, boarding bridges) to facilitate boarding and hand-to-hand combat; battles of Mylae, Ecnomus, the Ægates Isles; sea power decisive in these struggles; decline of sea power under the Roman Republic, battle of Naulochus; campaign and battle of Actium; sea power under the Empire mainly for police purposes, suppression of piracy, further decline coincident with that of Empire; Vandals destroy Roman sea power.

The author's conclusions are given in a final chapter, in which early sea power is considered in relation to piracy; its constructive and destructive influence; its influence on the growth of civilization and imperialism; sea power and Athenian culture; sea power and democracy; its malign influence; small importance of sea power in development of Roman institutions; later decisive influence on imperialism; the Mediterranean a Roman lake, effect on civilization and Christianity.

The following are characteristic extracts. Page 208: ". . . . the early Cretan, Phœnician, Carthaginian, and Grecian navies alone made possible an extensive commerce. Only by the protection of the fleets of war could the riches and products of many lands be brought together by commerce for the development of a higher and finer civilization; only through commerce upheld by sea power could the rudiments of civilization, the higher mechanic arts, the alphabet, the art of writing, be disseminated among barbarous or savage peoples over the basin of the Mediterranean.

The broadening and enlightening effect upon the human mind of knowledge gained through voyages of commerce and discovery—such as the rotundity of the earth and its revolution about the sun as proved by the Phœnician circumnavigation of Africa—must likewise have been incalculable."

Page 222: "A great naval battle, Actium, saved the empire from probable dissolution and established the *pax Romana* by land and sea. The consequences that followed were simply incalculable. For the first time in history a single people held absolute sway over the whole Mediterranean; for the first time the peaceful merchant might ply his trade tolerably secure from pirate or hostile war craft. The result was a tremendous commercial prosperity, an outpouring and diffusion of wealth such as the world had never known and which has only been surpassed in comparatively modern times. Through the channel of commerce, upheld by sea power, there flowed into Rome and Italy the arts, the sciences and the literatures of the nations of the eastern Mediterranean, particularly of

Greece; this culture, after a slight transmutation by the Latin mind, was handed on, largely by sea-borne commerce, to the barbaric peoples of Gaul, Spain and Britain. As the conquests of Alexander spread Greek civilization over a large part of Asia, so Roman sea power was largely instrumental in completing the Hellenization of western Europe and in diffusing Roman genius for law, order and organization over the face of the known world."

Following are thirty-two pages in interesting appendices, containing extracts from ancient authors on ship construction, blockades, sea fights, tactics, need of preparation, galleys and sailing ships.

Then follows a very complete bibliography of about nine pages, which will be most useful to students of naval history.

Finally there is a copious index of twenty-eight pages. There are throughout the text two maps of the Mediterranean and twenty-two plans and illustrations.

The foreword of Admiral Moffett draws an interesting comparison between the controlling factors of sea power in ancient times and at present. There are lessons from the past that may well be taken to heart today. His comments in this connection are just and to the point, as for instance, page xi, "Mr Shepard's book abounds in proofs of the fact that sea power since the early days has always affected the welfare of maritime nations. Those developing it gained great prominence and lived long. Those neglecting it suffered thereby. This should be taken home to our own condition among the nations of the world. Our maritime interests must be protected. Adequate sea power alone can guarantee that protection. Even our existence among the first powers of the world depends upon the development of our sea power to a stage which will preclude attack by other nations. The Washington Conference treaties have placed restrictions on the strength of our fighting force; but other nations entering into the agreement have also restricted their fighting forces. It is our duty at all times to maintain in a highly efficient state the force allowed us by the treaty."

The book is attractively gotten up, with large print and numerous plans and illustrations. The spelling dreadn*a*ught is employed throughout the book. There is authority in the dictionaries for nought as well as naught, but dreadn*a*ught is the spelling given as meaning a waterproof cloth. Finally, some years ago, the Navy Department ruled that in that department the word should be spelled with an *a*. However, the type is named after the British battleship *Dreadnought*, the first of the type, which thus becomes a proper name; and unless such derivation is to be discarded, the word should be spelled the same, that is, with an *o*.

On page 121, and in the map and index, occurs "Sycros." This seems to be intended for "Scyros," or "Skyros." On page 166, it is stated that the Roman vessels built in 243 B. C. to meet the Carthaginians had discarded the *corvi* (boarding bridges), which were heard of no more. The battle took place the following year off the Ægates Isles. In the illustration

facing the same page several boarding bridges appear. On page 198, the date 277 B. C. is apparently intended for A. D (See the next paragraph, ten years later, 287 A. D.) On page 203, the date 445 A. D. for the sacking of Rome by the Vandals is apparently meant for 455 A. D.

Note is to be made of the author's adherence to the old version of the guilt of Theramenes and Thrasybulus, after the battle of the Arginusæ Isles, 406 B. C., page 115. These two captains are said to have shifted the blame on the shoulders of the admirals (generals) in command, for not providing suitable means for rescuing the Athenian sailors from the disabled galleys, resulting in the condemnation of the admirals. Xenophon took this view, among the authorities quoted, also Lysias, not quoted. The author describes the condemnation of the admirals as "one of the foulest judicial murders known in naval history." Grote, who is mentioned in the bibliography, but not quoted, takes the opposite view, having found Xenophon biased and untrustworthy. It is of interest that Theramenes is the hero of Professor Gaines's *Gorgo,* which Lord Bryce has characterized as the best historical novel. After the appearance of *Gorgo,* Professor Perrin of Yale published in the *American Historical Review* for July, 1904, "The Rehabilitation of Theramenes." Finally, Aristotle, in the *Constitution of Athens,* named Theramenes as one of the three citizens who had rendered Athens the greatest service.

The minor imperfections that have been noticed do not detract from the value of the work as a whole. The author evinces much study and research and has provided a volume of unusual interest. While the story, as has been mentioned, is meant primarily for the general reader, naval officers will not fail to be interested; and apart from the general bearing of sea power, they may draw their own conclusions as to the dependence of tactics and strategy on certain inherent principles that may be deduced from the facts that are so entertainingly narrated.

LIFE OF ADMIRAL OF THE FLEET SIR ARTHUR KNYVET WILSON, Bart., V. C., G. C. B., O. M., G. C. V. O., by Admiral Sir Edward E. Bradford, K. C. B., C. V. O. New York: E. P. Dutton and Company, 1923. $5.00

A delightful book; one which, though naturally appealing more to the naval profession and historians who will find in it a store of interesting historical sidelights, is yet of keen interest to the non-professional mind. It is a book, indeed, worth owning and rereading, and should find a well deserved place, especially in the naval family's reading list, for its graphic descriptions in the portrayal of the English naval service for the sixty years preceding the World War make it delightful to read aloud. Embodying, as it does, the true spirit of naval service, it has a particular value to the young officer. The charm of the biography, which, indeed, has only two really dry spots, one at the beginning in describing the Wilson family

tree, and the other in what seems a rather profitless discussion of the armored cruiser program, rests upon the author's wise use of Sir Arthur's letters which are characterized by an unusually happy faculty for the picturesque and the graphic.

Wilson, whose whole soul was in his profession, was an indefatigable worker. This, with his desire to accomplish a task and with his tenacity of purpose, often led him to require an undue amount of work from others. In consequence he had long been known to the men as "'Ard 'Eart" and "Tug," the latter having been a famous prize-fighter noted for his tenacity and pluck. On the other hand, he knew the value of recreation and liberty, and "imposed no petty restraints on the liberties of his officers or men." He was "straightforward and firm as a rock," and "always accessible and unruffled," though rarely gave reasons for his "actions or opinions." If he did, his answers were so condensed that little could be got out of them. This made it difficult at times to collaborate with him. His main non-professional hobby was hunting which generally occupied his periods of leave, though he was fond of all outdoor sports and when serving on the *Brittania,* the school for young cadets, "he created quite a new departure by personally taking part in cricket, football and other games of the boys, considering it to be as much a part of his duty to do as anything else." His simplicity was most pronounced. He objected to being cheered by his crew and when he was awarded the Victoria Cross for valiant work with the naval brigade at El Teb, he wrote: "If I could only have got a basin of water and washed my face I should have escaped notoriety, but I only had a little cold tea in my waterbottle, and until we got to the wells there was no water to be got, so the blood ran all over my face, and the correspondents spotted me." Sir Arthur had an especially warm place in the hearts of the Japanese naval officers, as he had been a member of the British naval commission sent to Japan in the late '60's to organize a Naval Academy. Unfortunately the outbreak of a civil war in Japan brought the work to an untimely end. In the latter part of his life he took much interest in the establishment of a sailors' home in Weymouth, contributing both money and effort, and often responding with effective sympathy to those in need.

After two years at Eton, with some additional coaching by his father, Commander Knyvet Wilson, R. N., Arthur Knyvet Wilson began his noteworthy career in the Royal Navy, under real war conditions, as a midshipman on board H. M. S. *Algiers,* then participating in the Crimean War operations in the Crimea. He again found himself under fire on the China station, in one of the periodic Chinese outbreaks, in 1857, when he wrote in much disgust: "Captain Hall takes too much care of youngsters altogether." In 1886, after two other cruises, he joined the *Excellent* "to qualify for gunnery lieutenant," contributing much from then on to the development of gunnery. In 1870 he began his outstanding professional specialization in torpedo work, as a member of a committee appointed by the Admiralty to investigate Mr. Whitehead's torpedo. In the spring of 1876

after a cruise to India in the *Raleigh*, he was appointed as a commander of the *Vernon*, the school of torpedo instruction. "This," writes his biographer, "was a new departure in his professional career . . . . and there lay before him the development and improvement of new weapons which were to revolutionize naval tactics and ship construction." After his promotion to captain in 1879, he was given the command of a torpedo depot ship, the *Hecla*, attached to the Mediterranean fleet. He at once began a series of "fleet exercises in mining, counter-mining, running torpedo boats and practicing jumping booms," as well as practical work in rigging net defenses, but, in spite of hard work, time was found for recreation for all hands. "There were expeditions to places of interest, lawn tennis parties, picnics and dinners, seining parties and fishing excursions." It was during this cruise that Wilson rendered such valuable service in cooperating with the army to quell the "Revolt of the Colonels," led by Arabi Bey, in Egypt in 1882. He and Fisher constructed an armored railway truck with gatling guns and upon another truck mounted a 40-pounder. It was during this campaign, while preserving order at Port Said, that he wrote: "I got myself in hot water with everybody in this country by giving passage from Malta to a Mr. Broadly, who is the lawyer retained to defend Arabi. They all are so bloodthirsty they want to shoot him, too; but there are so many other rebels in high places in England that I should like to shoot first, and as rebels go, I think Arabi is rather a good sort."

His next torpedo work was done as chairman of the Torpedo Discharge Committee, and though his specialization was interrupted by a tour of duty on the Cape station, as flag captain, where he took up the gunnery problem of smoke interference in night firing, he returned to England in 1887 to accept the post of what he thought would be Director of Torpedoes at the Admiralty but what really turned out to be Assistant Director of Torpedoes under the Director of Ordnance. "It is," he wrote, "as if they had offered me a situation as cook and then made me a scullery maid." He contributed much, nevertheless, by his experiments in firing torpedoes from submerged tubes and his devices of "hook brackets" and the two steadying studs "have been continued ever since." Defense torpedo tests with "continuous" and "ladder" booms were taken up after his transfer, in 1889, to the *Vernon*, the torpedo school, as captain. Associated with him in this boom testing was Lieutenant Sturdee, of Falkland fame, who was then in command of a torpedo boat. It was at this time, too, that Wilson invented the "Pioneer," a device that "fixed in the head of a torpedo would shear its way through the wire nets suspended as a protection round the ship." His next torpedo work was to test out the qualities of a "new type of vessel called a torpedo boat destroyer,' but this was not done till after a tour of duty in the Mediterranean as captain of the *Sans Pareil*, with Jellicoe as his commander, whose promising abilities, however, tempted the admiral to take him on the flag ship, much to the disgust of Wilson who considered it sheer "poaching."

In August, 1897, he became Controller of the Navy in charge of all materiel from ship construction to supplies. This was one of the most

hectic periods of his career, for his department bore the brunt of the attack led by the Navy League against the naval administration. It was on this occasion that sandwich men "paraded the streets of London, bearing placards headed 'Death Traps,' and professing to give a list of ships armed with obsolete muzzle-loading guns." In the excitement of the general election in 1900, known as the Khaki Election, over the government's Boer War record, the interest of the public, whose naval confidence had seemed shaken, "was soon swamped, in spite of the efforts of the League." Shortly afterwards Rear Admiral Wilson was given the command of the channel squadron.

"What everyone was looking forward to with critical interest was how he would handle the squadron at sea," but no one had long to wait, for "on the first occasion of going out of harbor he introduced a new practice by taking the battle squadron out in two lines instead of one as had always been done before." It was considered a decided improvement and quickly imitated a year later by Prince Henry, then commanding the German Fleet. When, in 1903, Wilson was selected as the "first commander-in-chief of the home fleet," it was universally felt that no better selection could be made. This feeling, "both in and beyond professional circles," was well voiced in the *Times*, which described him as "intrepid in tactics," "astute and original in strategc interprise," and "a very type of a fighting admiral."

Under a new plan of ship distribution, in 1904, the home fleet, with an additional battleship division, became the channel fleet, with Wilson continuing in command as vice admiral. This was his last command which he relinquished early in 1907, when he was completely surprised by the King's giving him the "commission as admiral of the fleet." His simplicity of spirit was well shown by his last official act before leaving the ship, when in bidding his officers and men farewell he said: "She had been first in gunnery and sports as well as in good discipline, and in wishing them 'Goodbye' he hoped they would maintain this to the end by not cheering him when he left."

His expected ease of life, however, was of short duration, for upon the retirement of Sir John Fisher as First Sea Lord, he was prevailed upon by the King to fill that vacancy. It was a most happy selection as Admiral Wilson had a national reputation and "was recognized as the most capable sea officer of his time," the navy having "ample confidence in his firmness and justice, and in his sound and independent judgment." These qualities were especially needed as the previous administration "had created feelings of distrust and insecurity among officers of high rank." With the replacement of Mr. McKenna as First Lord by Mr. Churchill, a new board was summoned and Admiral Wilson retired again to Swaffham, declining the offer of a peerage. When the World War broke out he was again called to the Admiralty upon the appointment of Lord Fisher as First Sea Lord, as an assistant to him, Admiral Wilson accepted at once, "stipulating only that he should give his services without accepting appointment or pay."

His joining the naval administration "greatly helped to restore public confidence after the loss of the three cruisers, and to maintain it under the worse shock of Coronel." The assistance he rendered during the week following Lord Fisher's resignation and abrupt departure, without waiting to turn over the duties to a successor, "was a great service to his colleagues, to the government, and to the country." After the reconstitution of the board he became what was really "an unofficial staff officer," ready to give help wherever wanted, attached to no particular office, "but working principally with the chief of the staff. 'There is no man in this building,' said this officer one day, 'whom I would rather trust to thrash out a difficult problem than Sir Arthur Wilson.' "

H. F. S.

The Best News Stories of 1923. Edited by Joseph Anthony. Small, Maynard & Co., Boston. Price $2.50 Net.

In the June issue of the PROCEEDINGS (whole number 256) under the title "Newspaper Publicity for the Navy," attention was drawn to the necessity for a more general dissemination of Navy news. Those who are interested in this subject and who desire to do work along the lines indicated will find in Mr. Anthony's book practical models for their guidance. The volume contains seventy-four stories, selected from many hundreds that were considered. It may be taken as fairly representative of the best products of the newspaper practices of the day. A study of these models will indicate more clearly than much descriptive matter and many instructions the accepted style and method to adopt in the preparation of copy for the press. Although the stories are interesting in themselves and make entertaining reading, it is not for this reason that the book is recommended. It constitutes a valuable textbook and guide for all who desire to produce acceptable copy for newspaper publication.

There is represented in classified form the best pieces of straight reporting, the best feature and magazine page stories, the best foreign correspondence, interviews, human interest stories, sport stories, etc. It is interesting to note the general application of the newspaper rule which calls for the whole story in the first paragraph; interesting to see how details are mentioned in the order of their importance; interesting to note how the story may be "cut" by eliminating paragraphs from the end. Those who write for newspapers will find the book a big help. Those who read newspapers will find it delightfully entertaining.

G. E. B.

SECRETARY'S NOTES

Membership Present Membership, 4359. Changes since last report: New Members, 13. Resignations, 2. Deaths, 1. Total Increase, 10.

Articles The Institute desires articles of interest to all branches of the service, including the reserve force. Non-members as well as members may submit articles, and authors receive due compensation for articles published. Compact, well digested articles are more likely to be accepted for early publication. In accepting articles for publication, the Institute reserves the right to have such articles revised or rearranged, where necessary, in order to bring them up to the required standard of articles published in the PROCEEDINGS—the cost, if any, to be deducted from the compensation due the author.

Reprints of Articles Twenty copies of reprints are furnished authors free of charge. Additional copies to the number desired will be furnished at author's expense, provided request is made before going to press.

Discussions Discussion of articles published in the PROCEEDINGS is cordially invited. Discussions accepted for publication are paid for at approximately one-half the rate for original articles.

Book Reviews As soon as practicable after the publication of books on subjects of professional interest, the Institute aims to publish authoritative reviews of them.

Address of Members In the past, many errors have resulted from the habit of changing an officer's address as soon as his transfer orders are published in the papers. No change will be made in the future except upon receipt of the

Navy Directory, or notification by the member concerned. Reliance upon the former method may, in extreme cases, mean a delay of almost four months.

To insure the prompt delivery of the PROCEEDINGS and other communications from the U. S. Naval Institute, it is essential that members and subscribers *notify the Secretary and Treasurer without delay of every change of address.* No responsibility can be accepted for failure to receive the PROCEEDINGS, where members fail to comply with this rule. Changes of address should reach the Institute by the 25th of the month, to be effective for the issue of the PROCEEDINGS of the following month.

Coupons for Applications

For the convenience of members making application for membership or for subscription, or informing the Institute of changes of address, a number of blank forms will be found elsewhere in this issue. It is hoped that members will take full advantage of these in order to reduce clerical work of all concerned.

The Board of Control having decided to publish the names of new members joining the Institute, the following list shows who have joined since 1 January, 1924:

Comdr. Asaph Hall, (Math) U.S.N., Ret.
Comdr. R. A. Spruance, U.S.N.
Ensign D. B. Bennett, U.S.N.
Ensign P. W. Siegrist, U.S.N.
Ensign C. A. Legg, U.S.N.
Lieut. Comdr. H. B. Grow, U.S.N.
Ensign W. S. Parsons, U.S.N.
Ensign W. N. Mansfield, U.S.N.
Lieut. W. F. Christmas, (CC) U.S.N.
Ensign J. I. Taylor, Jr., U.S.N.
Midshipman W. F. Kline, U.S.N.
Ensign J. T. Warren, U.S.N.
Ensign J. E. Chapman, U.S.N.
Ensign W. B. Whaley, U.S.N.
Ensign P. McC. Boltz, U.S.N.
Ensign P. H. Riggs, U.S.N.
Ensign Woodward Phelps, U.S.N.
Ensign E. T. Layton, U.S.N.
Chf. Gunner H. A. Booth, U.S.N.
Captain H. A. Bispham, U.S.N., Ret.
Lieut. Comdr. W. D. LaMont, U.S.N.
Major F. S. N. Erskine, U.S.M.C.
Captain John Waller, U.S.M.C.
Colonel W. G. Powell, U.S.M.C.
Captain L. W. Wright, U.S.M.C.
Captain C. F. Kienast, U.S.M.C.
Ensign J. T. Hogg, U.S.N.
Captain Wethered Woodworth, U.S.M.C.
Captain J. E. Reich, U.S.M.C.
Lieut. Colonel R. S. Hooker, U.S.M.C.
Marine Gunner J. A. Higgins, U.S.M.C.
Ensign J. H. Garvin, U.S.N.
Colonel C. H. Lyman, U.S.M.C.
Captain M. A. Willard, U.S.M.C.
Captain F. E. Verner, U.S.M.C.
Major A. J. White, U.S.M.C.
Captain E. H. Jenkins, U.S.M.C.
Ensign C. E. McDonald, US.N.
Lieut. William Earl Miller, U.S.N.
Captain W. J. Crosson, U.S.M.C.
Lieut. Colonel E. A. Greene, U.S.M.C.

Ensign G. W. Evans, U.S.N.
Captain Otto Salzman, U.S.M.C.
Captain J. M. Swinnerton, U.S.M.C.
Lieut. M. H. Mizell, U.S.M.C.
Brigadier General B. H. Fuller, U.S.M.C.
Lieut. J. B. Wilson, U.S.M.C.
Lieut. C. W. Kail, U.S.M.C.
Captain Thomas Dwight, U.S.M.C.
Lieut. G. T. Cummings, U.S.M.C.
Marine Gunner A. D. Ryan, U.S.M.C.
Marine Gunner R. C. Allan, U.S.M.C.
Ensign Winston P. Folk, U.S.N.
Major C. A. Lutz, U.S.M.C.
Major General W. C. Neville, U.S.M.C.
Comdr. H. M. Tolfree (MC) U.S.N.
Captain E. J. Grow, (MC) U.S.N.
Captain E. P. McCaulley, U.S.M.C.
Comdr. Benjamin Dutton, Jr., U.S.N.
Captain M. C. Gregory, U.S.M.C.
Captain T. F. Joyce, U.S.M.C.
Lieut. Colonel R. R. Wallace, U.S.M.C.
Major J. P. Willcox, U.S.M.C.
Captain W. G. Hawthorne, U.S.M.C.
Lieut. Frederick Bense, U.S.N.R.F.
Lieut. Swepson Earle, U.S.N.R.F.
Lieut. A. G. Hall, U.S.C.G.
Lieut. Comdr. H. A. Jones, U.S.N.
Mr. E. M. Lawrence, Bay Shore, N. Y.
Mr. Henry Rawle, New York, N. Y.
Mr. C. A. Peerenboom, Menasha, Wis.
Lieut. F. B. Marty, Cuban Navy
Lieut. Comdr. A. B. deSousa, Portugese Navy.
Mr. C. H. Umstead, Washington, D. C.
Mr. W. B. Lowndes, Baltimore, Md.
Mr. F. B. Noyes, Washington Evening *Star*.
Mr. Paul Patterson, Baltimore *Sun*.
Mr. A. L. Miller, Battle Creek *Enquirer and News*.
Mr. J. O. LaGorce, National Geographic Magazine.
Mr. J. G. Stahlman, Nashville *Banner*.
Mr. H. P. Wilson, Philadelphia *Record*.
Mr. H. J. Winn, Rochester, N. Y.
Mr. R. F. Andrews, Worcester *Telegram-Gazette*.
Mr. C. E. Broughton, Sheboygan *Press-Telegram*.
Mr. C. A. Hamilton, Buffalo *Times*.
Mr. F. P. MacLennan, Topeka State *Journal*.
Mr. Moses Strauss, Cincinnati *Times-Star*.
Mr. R. G. Watson, Houston *Post*.
Mr. F. E. McMurtrie, London, England.
Mr. M. A. Myers, Chicago, Ill.
Mr. F. G. Bonfils, Denver *Post*.
Mr. J. C. Collier, Dubuque *Times*.
Mr. W. F. Hardy, Decatur *Herald*.
Mr. J. H. Kelly, Sioux City *Tribune*.
Mr. W. L. McPherson, New York *Tribune*.
Mr. H. E. Armstrong, New York *Times*.
Mr. F. W. Eldridge, Los Angeles *Examiner*.
Mr. E. P. Fries, Cincinnati *Post*.
Mr. E. L. Smith, Syracuse, N. Y.
Lieut. V. P. Wagner, U.S.N.R.F.
Mr. G. O. McGrath, San Francisco, Calif.
Lieut. Octavio Machado, Brazilian Navy.
Lieut. T. S. Harloe, U.S.N.R.F.
Mr. Clinton Sayres, Brooklyn, N. Y.

H. G. S. WALLACE,
Commander, U. S. Navy, Secretary and Treasurer.